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MAY

1937

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VOLUME 5

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NUMBER 2

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THE NATIONAL ASSOCIATION OF

PURITAN MAID
TRADE MARK REG.

Important Truths About Gas Anesthetics

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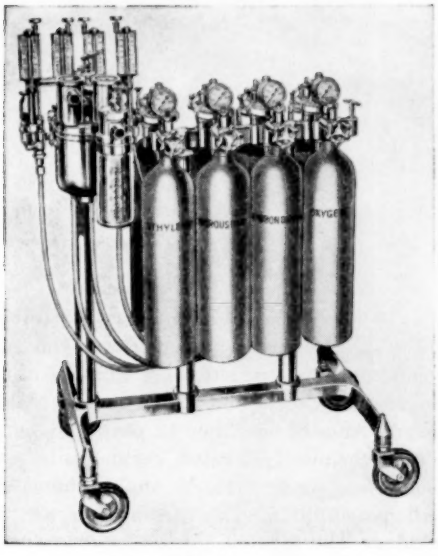

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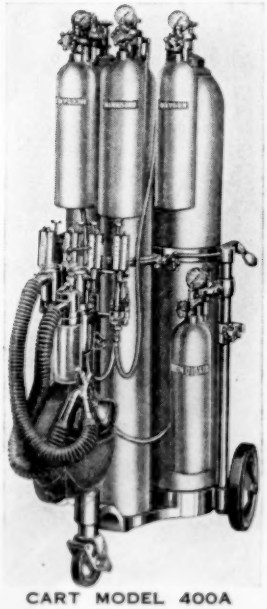

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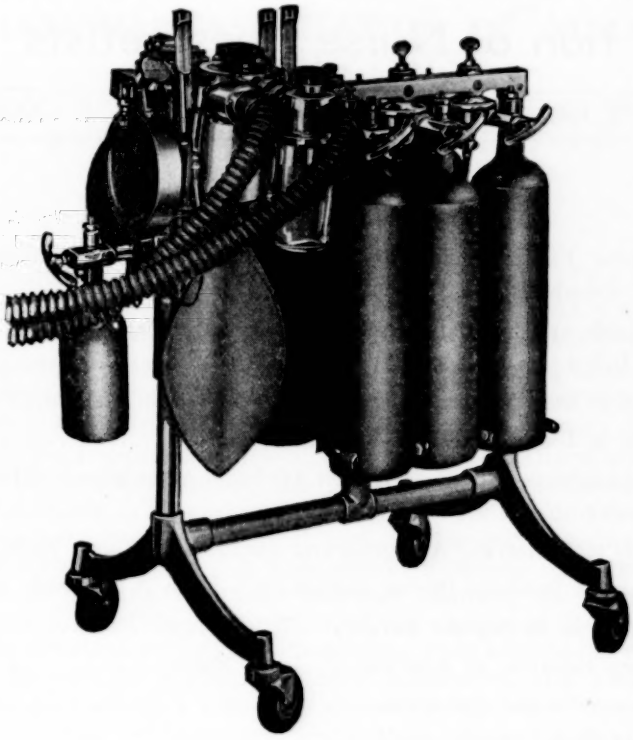

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The Bulletin of the National Association of Nurse Anesthetists

VOLUME 5, NO. 2 MAY, 1937

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FIFTH ANNUAL MEETING

NATIONAL ASSOCIATION OF NURSE ANESTHETISTS

WILL BE HELD IN CONJUNCTION WITH THE AMERICAN HOSPITAL ASSOCIATION

September 14th to 17th, 1937

Atlantic City, N. J.

Convention headquarters, Ritz-Carlton Hotel. The Ritz-Carlton is situated directly on the Boardwalk and within walking distance of the convention hall in the Atlantic City Auditorium.

A special reduction in rates has been obtained, and while an ample number of rooms has been reserved for our group, it is advisable to make reservations early.

With the irresistible lure of this famous seashore resort, particularly in mid-September, the 1937 meeting promises new attendance records. This most famous of all year-round resorts provides almost every form of sport and amusement possible. Atlantic City's eight-mile beach is unexcelled anywhere in the world and there is surf bathing well into October. Among the great amusement piers that extend far out over the ocean is the Steel Pier, where the greatest variety of attractions ever assembled under one roof can be seen for a single nominal admission, and Young's million dollar pier offers a similarly diverse program.

For further information write Miss Mary Lucile Goodman, Executive Secretary, 2065 Adelbert Road, Cleveland, Ohio.

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NITROUS OXIDE AND OXYGEN ANESTHESIA IN ORAL SURGERY

P. J. AUFDERHEIDE, D.D.S.
Cleveland, Ohio

General anesthesia is no doubt one of the greatest gifts that has ever been given to humanity. It has made possible most of the major and minor surgery which not only has saved many lives but has made possible good health and happiness for many who otherwise faced a life of despair.

Probably the safest of all the general anesthetics is nitrous oxide administered with oxygen. It is eliminated from the blood stream within five minutes after being discontinued, produces no by-products of an acid nature, and is safe to use for a short period of time in most cardiac cases, and in diabetes and other affections in which an existing acidosis complicates surgical procedure.

People today are much more neurotic than they were years ago and have less tolerance for even minor surgery, such as tooth extraction. We owe such patients a general anesthetic to minimize the psychic reaction, otherwise much necessary surgery will be neglected or permanently postponed. While we are dealing with nitrous oxide and oxygen anesthesia for oral surgery only, in this article, if cautiously administered it is the safest anesthetic for most surgical operations, ranging from extraction of teeth to the most delicate brain operation. Success in its use depends upon the knowledge and understanding of the following fundamentals:

1. Physiological action
2. Symptoms in all stages of anesthesia
3. Technique of administration
4. Psychology of handling the patient
5. Additional precautions and considerations in general anesthesia for surgery in the oral cavity
6. Difficulties encountered and the remedies
7. Handling children

So much has been written in regard to the first two points that I will pass over them quickly.

1. *Physiological Action*

When nitrous oxide is administered it robs the patient of enough oxygen to produce narcosis. This being the case it is an anesthetic the antidote for which is available, namely, oxygen. Fortunately, after the patient is anesthetized, enough oxygen can be administered to maintain life, and the balance of the gas administered, namely, nitrous oxide, is sufficient to maintain anesthesia. If any air is inspired it will make this impossible, for if a certain patient requires 10 per cent oxygen and 90 per cent nitrous oxide, the nitrogen in the air would displace either oxygen or nitrous oxide and balanced anesthesia would be impossible. Nitrous oxide reduces the activity of certain brain cells by reducing the available oxygen, while there seems to be enough oxygen for adequate functioning of other tissues. If all cells were equally affected by oxygen-want, respiration and other important functions would cease with the onset of anesthesia. When changes in the mixture of the two gases are made, it must be remembered that it takes about ten seconds for the new percentage of gases to be absorbed into

the blood stream from the lungs, circulated to the heart and conducted to the brain, which will then present the symptoms of the new mixture. With nitrous oxide we are producing a stage of asphyxia causing unconsciousness without producing damaging effect on tissue.

2. *Symptoms in All Stages of Anesthesia*

The first requisite for scientific anesthesia is to know the symptoms presented in all stages, which are classified for convenience into three groups, as follows:

(a) Muscular
(b) Respiratory
(c) Ocular

The various stages in anesthesia may be classified as follows:

1. Introductory or analgesia
2. Excitement
3. Anesthesia
   (a) Light
   (b) Normal
   (c) Profound
4. Danger

Symptoms in the stage of anesthesia:

(a) Light anesthesia—
   (1) Muscles: purposeful movements or rigid muscle reflex to pain, and resistance.
   (2) Respiration: superficial breathing, rather irregular; prolonged inspiration; breath-holding; noise due to pain
   (3) Eye: pupils contract to light; conjunctiva sensitive; eyelids resist opening; eyeballs roll quite quickly

(b) Normal anesthesia—
   (1) Muscles: relaxed; expression as if in normal sleep; no reflexes
   (2) Respiration: machine-like, regular and a little faster than normal; inspiration and expiration about equal; no phonation
   (3) Eye: pupils small; do not contract to light; no conjunctival reflex; eyelids relaxed, usually closed; eyeballs looking straight forward or slowly rolling

(c) Profound anesthesia—
   (1) Muscles: clonic movements, jactitation; wild expression of face; marked rigidity and sometimes opisthotonos
   (2) Respiration; spasmodic and irregular prolonged expiration; phonation
   (3) Eye: pupils larger and do not contract to light; eye fixed and usually pointing downward; eyelids usually wide open

Danger stage—
   (1) Muscles: tetanic contracttion of all muscles, back arched, arms either far forward or backward, depending upon whether the biceps or triceps are the stronger
   (2) Respiration: forced expiration and very short inspiration; cessation of breathing
   (3) Eye: pupils very large—the iris may appear as a very narrow ring; pupil does not contract to light; eye practically always pointing downward or to one side

The above is a brief review of some of the most common symptoms. The closer these symptoms are watched the more intelligently the anesthetic is administered.

Cyanosis is not a true symptom. It is a coincidence rather than a symptom. The plethoric type of pa-

tient may become cyanotic in the excitement stage and remain so in all deeper stages. An anemic patient with 35 per cent hemoglobin or under may not become cyanotic in any stage. If color alone is watched and used as a symptom of anesthesia 95 per cent of the cases will be carried too deep. Ninety-five per cent of the cases in the normal anesthetic stage will be pink in color. The fact that the anesthetic has been influenced by the patient's color has probably been the cause of more failures than any other factor. All true signs of anesthesia are reactions of various nerves reflected through the muscular system. Some anesthetists in giving a short anesthesia watch only the hand, respiration or the eye. However, the efficient anesthetist generally will not consider just one symptom but will check up on all of them periodically during the anesthesia.

3. *Technique of Administration*

Nitrous oxide is more difficult to administer than most other general anesthetics because it diffuses readily through the epithelial walls of the alveoli into the blood stream and is also liberated therefrom very quickly. Keep in mind that we have the antidote for nitrous oxide available at all times, in oxygen, which is not true with any other anesthetic.

In the majority of cases it is preferable to start the anesthesia with two inhalations of nitrous oxide at low pressure, mixed with a little air or 10 per cent of oxygen. This prevents the feeling of suffocation to a great extent. From the third inhalation on, pure nitrous oxide is used until the patient reaches the normal anesthetic stage. This hastens the induction and minimizes the duration of the excitement stage. The hand should be held over the mouth to cause breathing through the nose. With the first two breaths not much pressure is needed but from this point pressure is used, which makes it easier for the patient to inhale the anesthetic and less feeling of suffocation is experienced. Occasionally we have seen a patient in whom induction of anesthesia seems slow, in which case the pressure of nitrous oxide may be increased because it will be absorbed quicker by the blood stream and narcosis will result much more quickly. The exhaling valve on the nasal inhaler is kept open until anesthesia is produced. This makes breathing more comfortable for the patient.

When the patient reaches the normal anesthetic stage the mixture is changed, using from 5 to 10 per cent oxygen for adults and 15 per cent for children, and the exhaling valve is closed. From this point on the changes in the mixture are dictated by the symptoms presented by the patient. A uniform time for induction is not advocated because no two patients are alike. Remember that the anesthesia will continue to deepen for ten seconds after the change is made in the oxygen percentage, because the new mixture containing oxygen has to be absorbed into the blood, circulated back to the heart and then to the brain before the new mixture will present its symptoms. Probably the greatest factor in failures is the making of too many changes in the mixture. Averaging one thousand cases of five minutes' duration I would say that not over two changes per anesthetic are necessary.

The nasal inhaler must be held in contact with the tissue surrounding the nose with gentle pressure to prevent leaks. The inhaler must also be held far enough down on the upper

lip so that it does not shut off the nares. The prop or mouth gag is inserted after about five inhalations of the anesthetic. The patient is in the analgesic stage and can tolerate it better at this time. Gauze folded in pieces about two inches wide and no shorter than six inches long is placed in the posterior of the mouth to prevent mouth breathing. This makes it possible to control the mixture the patient is breathing through the nose. Enough pressure is produced at the apparatus so that the patient cannot breathe through the mouth. If the mouth pack makes it difficult for the patient to exhale, the exhaling valve on the inhaler should be opened slightly.

While nitrous oxide is a quick-acting anesthetic, if the symptoms are watched closely it will never be necessary to hurry in making changes in the mixture. Some patients have a wider margin of anesthesia than others. If by changing the mixture of oxygen ½ per cent more or ½ per cent less the patient goes from light to deep anesthesia or vice versa, it indicates that the patient has a very narrow margin of anesthesia. If however it is changed 3 or 4 per cent and not much difference is shown in anesthetic symptoms, the patient has a wide margin of anesthesia. If the patient shows symptoms of going into deeper or lighter anesthesia the throat, mouth, inhaler and tubing should be checked for the cause before the mixture is changed. Never lift the inhaler off the patient's nose if in deep anesthesia. This is occasionally done to let the patient breathe air to obtain oxygen. Remember, however, that an agent is available—pure oxygen, which is five times as potent as air because air contains only 20 per cent oxygen.

Let me again state that the ideal stage in which to keep the patient is that of normal anesthesia. The muscles are relaxed; respiration is machine-like, and inspiration and expiration are about the same in duration; the eye is pointing straight ahead and the eyeball may be slightly oscillating; the pupil is smaller than normal and does not contract to light. The patient may be perspiring a little. The mouth gag or prop and inhaler are kept properly in place. If the patient goes into profound anesthesia one or two breaths of pure oxygen may be administered to bring the patient back to the normal anesthetic stage more quickly, at which time we must remember that the patient may stop breathing for three to five breaths (oxygen apnoea). The patient will always start to breathe again as soon as there is enough carbon dioxide produced to stimulate respiration.

In certain cases that seem to come out of the normal anesthesia stage very easily into the light or excitable stage it is justifiable to use secondary saturation. The patient is given straight nitrous oxide until he is at the end of the deep anesthesia stage and then small percentages of oxygen are administered until he comes back to the deepest part of the normal anesthesia stage. There is quicker tissue absorption of nitrous oxide and the patient remains anesthetized more easily.

4. *Psychology of handling the patient*

Here, if anywhere, the patient has to be handled as well as the disease. The successful anesthetist immediately puts herself in the position of the patient, forgetting herself and making all conversation concern the patient. Remember that fear is probably the greatest factor we have to combat. Eliminating this emotion may

spell 100 per cent success, while not eliminating it may spell failure. Many people fear the removal of teeth as much as they do a major operation. How often have we heard women say, "I would rather have a baby than go through this."

The minute the patient comes into the office, talk to them about their general welfare, their children, and their interests and hobbies. It helps to build confidence because they feel that you are interested in them. Soft words of assurance help greatly, and such words as "hurt," "pain," "gas," "pulling of teeth," et cetera, should never be used, but rather say, "We are going to have a little nap which will be very comfortable and pleasant, so everything can be done easily."

All unnecessary noises should be eliminated and whispers should be used instead of loud conversation. Do not stand in front of the patient holding the inhaler before applying it, because it will be the only thing he can see and no attention will be paid to what you say. The nitrous oxide and oxygen apparatus should be back of the patient far enough so that he will not notice it. All instruments and appliances should be out of sight covered with towels. When the anesthetic is started, gently place the inhaler over the patient's nose, speaking soft, assuring words to him.

5. *Additional precautions and considerations in general anesthesia for surgery in the oral cavity*

A well developed technique will permit as much time for thorough surgery in the mouth as is necessary. There is no need for haste. On account of the mouth being open, both the anesthetist and the operator should assume the responsibility of seeing that the patient breathes through the nose. The anesthetist makes certain that enough pressure is administered from the apparatus, that the chin is up, and the inhaler adjusted properly to the nose. The operator should watch that the gauze sponges are placed so as to prevent air getting into the lungs through the mouth, thereby unbalancing the anesthetic mixture, and also to prevent blood or tooth particles getting into the trachea. The last mentioned is very important, and when the gauze sponges become saturated with blood they should be changed.

If the breathing is watched very closely it will be observed whether there is a great tendency for the patient to breathe through the mouth. This tendency may change during the course of the anesthesia and pressure from the apparatus may be raised or lowered in accordance with the action of the patient in this respect. Sponges placed in the mouth should reach from one side of the mouth to the other, at about the area of the anterior pillar of each tonsil. If they are forced back any farther they may contact the posterior pharyngeal wall and block off respiration. One end of each sponge should always protrude from the mouth. This is very necessary in order that an entire sponge may not get into the pharynx or even the trachea.

The position of the patient in the chair is important. When the mouth is open the head and neck should be in line with the chest. The chair is tipped back slightly, the weight of the patient helping to keep the buttocks back in the seat. If the body does not move down in the chair, the head will stay back, allowing free respiration. One hand of the anesthetist may rest on the forehead and one under the chin, with the fingers holding the inhaler. The knees should be uncrossed. The hands should be in the lap, folded

by crossing the fingers. This quite often holds the hands together when there is a little muscular contraction. A restraining belt adjusted so that it does not interfere with respiration helps with the unruly patient. This is necessary only in one out of about one hundred cases.

6. *Difficulties encountered and the remedies:*

A smooth anesthetic is the major factor in preventing trouble. If the depth of anesthesia is changed often during an anesthesia much more trouble will be experienced than when the normal stage of anesthesia is maintained during the entire operation.

Most patients coming to the office with a toothache or swollen jaw want attention immediately and there is no opportunity for preanesthetic preparation. Even though dental anesthetics are usually short, some simple preparation before the operation helps to secure success. A patient that gives a history of trouble before operation should have a thorough examination by a competent physician. To eliminate a toxic digestive tract a saline cathartic the night before would be indicated.

Nausea is practically always caused by deep anesthesia or fluctuation in the depth of anesthesia. Blood or gauze back in the pharynx can also cause it. Sometimes a little greenish hue of the patient's face may be observed and the patient may make an attempt to swallow. If one or two breaths of pure oxygen are given immediately nausea can often be prevented. If the patient does become nauseated and is no deeper than normal anesthesia, so that he has a cough reflex, he will not inhale any vomitus and when the procedure is over the anesthesia may be continued.

Nitrous oxide is not irritating to pulmonary tissue, therefore is perfectly safe to give to patients with arrested tuberculosis. It is safe for anemic patients and does not increase the blood dyscrasia, and is also safe to use in cases of high blood pressure. It is safe to use in diabetes because it does not increase the conversion of liver glycogen. Most diabetics which we see today are under fair control. Nitrous oxide does not interfere with the excretion of sugar by the kidneys. Toxemias are not exaggerated because nitrous oxide is in physical and not chemical combination in the blood stream. In short anesthesias up to ten minutes we very seldom see much increase or decrease in blood pressure.

The hyperthyroid patient is overcharged with oxygen constantly and will take a much smaller percentage of oxygen than a normal patient of the same age. A patient with myxedema will take a much higher percentage of oxygen than normal. A typical cretinous child I have kept anesthetized with 50 per cent nitrous oxide and 50 per cent oxygen. Anemic patients can be started with as high as 20 per cent of oxygen and this can gradually be cut down until anesthesia is established. They may usually be carried in anesthesia with a much higher percentage of oxygen.

Other groups that will give trouble are the athletic, neurotic, alcoholic and plethoric types. One very easy way to handle them is to premedicate with three grains of nembutal (for adults). It is quick-acting, the effect wears off in two hours and it gives perfect relaxation. This premedication is effective and it is possible to finish the necessary extraction without trouble. The operator should insist that the patient bring someone with him to drive him home, and the patient should stay at home the re-

mainder of the day. This treatment is much better than allowing one of the many things to happen so often experienced with this type of patient. Proper psychology plays an important part in handling these patients. In the case of the alcoholic, a drink of liquor fifteen minutes before the anesthetic often makes him more receptive.

In such cases as angina pectoris, uncontrolled diabetes, or active tuberculosis, the advice of the physician in charge should be solicited. Some tests that may be used for the patient coming into the office for extraction where history is unknown, are as follows:

1. Moot's Law—cardiovascular energy index

This is found by multiplying the sum of the systolic and diastolic blood pressures by the pulse rate. Taking the last two digits on the left hand side, the lowest limit of safety is 14 and the highest is 21.

2. Also regardless of blood pressure, rate and quality of pulse, a pulse pressure of less than 25 per cent or more than 75 per cent of the diastolic pressure is sufficient evidence that the patient is a bad anesthetic risk.

3. Breath-holding test:

Normal	25 to 30 seconds
Acidemia	20 to 25 seconds
Mild acidosis	15 to 20 seconds
Acidosis	10 to 15 seconds
Severe acidosis	5 to 10 seconds

A patient who can hold the breath less than 25 seconds must be watched closely. One that can hold the breath only 15 seconds or under should not be accepted as an office risk.

4. If a patient can walk up a flight of steps without becoming exhausted to such a point that he has to sit down, he is a good risk.

If the symptoms have been watched carefully, the anesthetic given properly, the patient kept in the proper position in the chair, and the operator assumes all his responsibilities, trouble is very seldom experienced. In spite of all this, one never knows when resuscitation may be necessary. If respiration stops do not become panicky. Raise the chin and pull the tongue forward even if a tongue forcep is necessary. The person assisting can compress the chest 15 times per minute. Each time the chest expands the inhaler should be on the nose, at the same time administering pure oxygen under pressure. The inhaler should be removed when the chest is being compressed. This makes a pulmotor of the apparatus. All blood, mucus and tooth particles should be kept out of the throat. Stimulants such as camphor and oil, and strychnine are given. These help only to bolster up the heart action—they do not help to open the entrance to the lungs and this is usually the primary problem which must be dealt with when respiration stops.

7. *Handling Children*

Many consider children a dangerous risk for nitrous oxide and oxygen. They do have a higher metabolic rate than adults, requiring a closer watch of the symptoms. If a child between the ages of three and twelve will not tolerate a local anesthetic and the mother wants a general anesthetic given to the child we owe that service, provided it is possible. These children on an average have teeth taken out twice between these ages. At City Hospital in Cleveland we have administered nitrous oxide and oxygen to about 60,000 indigent school children in the last 17 years without one unpleasant experience. Even with the rather unruly child the anesthetist

can hold the inhaler on the nose with the thumb and first finger of each hand, using the hands and the rest of the fingers to keep the chin up and the head in the headrest. The dentist can hold the two hands and keep the child back in the chair. When the patient is asleep the mouth gag can be inserted and the extraction may be started. The balance of the problem includes the correct handling of the anesthetic, gauze and mouth gag, and the anesthetist can always spare one finger to steady the gag. Children respond to new mixtures more quickly and they will utilize a higher percentage of oxygen. The little added attention these children need will be repaid many-fold by the personal satisfaction obtained because of the good results.

While general anesthesia has advanced to a stage where it has a very scientific background, still its reaction on different individuals is not always the same and its reactions with different operations also differ. A good anesthetic still demands back of it a thorough student with a strong individuality. To give an anesthetic is one thing—to practice the art of anesthesia is another.

ANESTHESIA AT THE AMERICAN HOSPITAL OF PARIS

JEAN McELROY
Nashville, Tenn.

At the end of my first year as an anesthetist, the opportunity of accepting a position at the American Hospital in Paris, France, was offered me. In making my decision there were a number of problems to be considered. There was a new language to learn; there would be new anesthetics and methods; and there would be surgeons who were not accustomed to the nurse anesthetist. The knowledge that the experience would be worth while influenced me to decide to go.

The American Hospital of Paris was founded by American residents of Paris, and was incorporated under the French law in 1906 and in the United States by Act of Congress in 1913. The new Memorial Building was officially dedicated on May 12, 1926, and has a capacity of 120 beds. It is a beautiful structure located in an exclusive suburb of Paris.

The anesthesia equipment consists of an American-made gas machine with yoke for nitrous oxide, oxygen and carbon dioxide, and the Ombrédanne mask, which is for the closed method. Ether is supplied in 150 cc. brown bottles; chloroform, in 30 cc. blue bottles. Ethyl chloride, with and without adrenalin, is supplied in 1 cc. or 2 cc. ampules.

Schleich is a mixture of:

Ether	6 parts
Chloroform	2 parts
Ethyl chloride	1 part

Balsoforme is a mixture of:

Ether	49 grams
Chloroform	34 grams
Ethyl chloride	10 grams
Goménol	5 grams

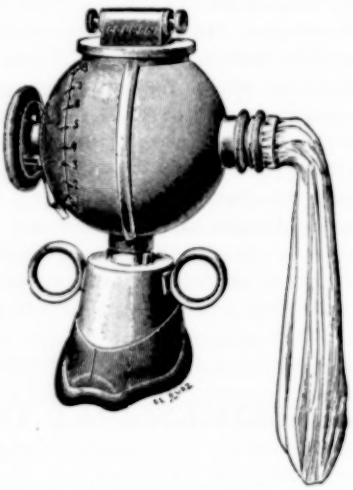
Both of these mixtures are supplied in large ampules. Ether, Balsoforme and Schleich are given entirely by the closed method. Ether, by the open drop method, is used only for children under two years of age.

The American surgeons use nitrous oxide, with ether added when necessary, or nitrous oxide inductions followed with ether by the closed method.

Several of the French surgeons use nitrous oxide but the majority use the Balsoforme and Schleich mixtures. Ethyl chloride is used entirely for tonsillectomies and other short operations; chloroform is used for obstetrics. With the Ombrédanne mask the anesthetic is poured into the sphère, containing ten strips of felt. The face piece is attached to this and applied slowly, the patient being instructed how to breathe. The ether is turned on very gradually from zero to six and by this time consciousness is lost, about ten minutes being required for the induction. The depth of anesthesia is easily maintained but if the respiration becomes too deep, the mask must be removed, as there is no way to regulate rebreathing.

The American and French surgeons on the hospital staff use morphine and atropine, or hyoscine, as premedication, but the visiting surgeons never use atropine and seldom give a narcotic. The blood pressure is taken at the ankle by the circulating nurse, a pressure of 120/80 being read as "12/8". The taking of blood pressure was not routine until I took over the department and obtained a sphygmomanometer and stethoscope from America.

An extreme Trendelenburg position is used, the head being approximately six inches from the floor. This often causes difficult respiration, but there



Omdrédanne Mask

is no problem of relaxation. The anesthetist sits flat on the floor trying to manage the heavy Ombrédanne mask.

The French surgeons and patients were very cooperative. It was necessary to learn the language, but once this was accomplished the work was more interesting. Some valuable friends were made and, all in all, my two years there were well spent. However, because of a low salary, the soaring of prices and the devaluation of the franc, together with the fact that I had a bad case of homesickness, I decided to return to America, arriving December 24, 1936.

ANESTHESIA IN DIABETICS

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The proper selection of an anesthetic for surgical diabetics cannot be considered in a restricted sense, since the connotations involved are manifold.

The number of patients involved is numerous, since it is estimated that about 2 per cent of the population of this country may be classified as having evidences of diabetes to a greater or lesser degree. Dr. Joslin has found that 50 per cent of all diabetics require a surgical operation performed at some time in their lives, so that there are always, in the population, about 100,000 diabetics who may have surgical possibilities.

Since 1921 the prognosis in diabetic surgery has changed to an enormous degree. The surgical mortality rates in the past were estimated as being 18 to 46 per cent, whereas at the present time no diabetic need be refused surgical benefit because of the extreme hazards of surgical procedure. Since the discovery of insulin the causes of death in diabetes have shown a great reversal; whereas 50 per cent of all patients who died of diabetes in the pre-insulin period died of coma, now 33 to 50 per cent die of surgical causes. This does not imply that these deaths are a post-operative mortality but that the cause of death involved surgical consideration. Much of this, of course, is due to the improvement in the management of the medical diabetic with insulin, so that the diabetic patient rarely dies of diabetic coma, but because inadequate or improper treatment, often the fault of the patient, ultimately develops surgical complications which result in dissolution.

The surgical treatment of diabetics is greatly on the increase. Phipps found in the Massachusetts General Hospital that in the four years preceding 1918 there were only 45 operations on diabetics; in the succeeding five years, ending in 1922, Young found 99; whereas, in contrast to this, in 1927, McKittrick and Root, in the New England Deaconess Hospital, operated on 113 patients with diabetes, or 10 per cent of the total diabetic admission.

Surgeons are called upon to treat diabetic patients surgically chiefly because of gangrene, abscesses, gallbladder disease, carbuncles, cataracts, or thyroid disease, and likewise, naturally, all the coincidental causes for surgery which may occur. In 250 cases analyzed by Beardwood in Philadelphia, 80 were operated upon for gangrene, i. e., about 30 per cent, and about one-half were operated upon for the more specific surgical conditions just mentioned.

The management of the surgical diabetic involves five problems: (1) diagnosis (2) appraisal of the general condition of the patient (3) appraisal of the local status (4) preoperative and post-operative care (5) choice of anesthetic.

The first matter to consider is that of diagnosis. It must be remembered that all patients who have glycosuria must be considered as having diabetes unless proved otherwise. Occasionally one encounters so-called "renal glycosuria," which is not a true dia-

betes, and oftentimes one may encounter a temporary or symptomatic glycosuria because of dietary indulgence, simple glycosurias due to certain endocrine states, et cetera. The significance of diabetes in surgical treatment is so important that in patients exhibiting evidences of gangrene, cataracts, marked arteriosclerosis, indolent wounds, ulcers or carbuncles, a blood sugar estimate should be made lest a hidden and possible insidious diabetes mellitus may be overlooked. In patients exhibiting these conditions, if there is no glycosuria it is not necessary to perform a glucose tolerance test, but a blood sugar test should be done with the patient fasting, so that the safety of the patient may be ascertained.

Preliminary to surgery all patients who have diabetes must be given careful appraisal of their general condition. Most noteworthy is the appraisal of the efficiency of the cardiovascular apparatus. Fifty per cent of all diabetics show evidences of arteriosclerosis, and 85 per cent of all diabetics are overweight. The influence of obesity in predicating circulatory difficulty and post-operative complications is well known. Examination of the cardiovascular apparatus, particularly in older diabetics, cannot be emphasized too strongly, and no technical procedure should be overlooked which may illuminate the situation. Because of the frequent association of angina pectoris and coronary occlusion with arteriosclerosis, the physical examination should be supported by an electrocardiographic examination, to reduce the percentage of error to a minimum, although there are many patients with coronary disease who will disclose no abnormality with any known tests.

The local situation must also be appraised from its various angles. In patients who have gangrene the degree and extent of the circulatory failure must be carefully noted by the color of the part, the temperature, presence or absence of pulsation in the vessels of the leg, and possibly with the aid of certain tests for circulatory efficiency, such as the histamine test. In diabetics, an X-ray picture for elucidation of sclerosis of the vessels is of value, and in many instances arteriography with radio-opaque substances might be of additional benefit. In patients who have carbuncle formation or abscess, or who have infected gangrene, there should be no delay in surgical relief. Infection is no contraindication, and in fact, demands immediate surgical relief, in spite of the diabetic potentialities. If necessary, give a sufficient dose of insulin with 1000 cc. saline, and operate.

The pre-operative care must be painstaking and careful. Admittedly, in patients who are in an acute infectious state with actual or threatening septicemia, surgery cannot be delayed, but in elective situations (which implies most surgical diabetic conditions) a period of preparation of two to ten days is advisable. At the present time many patients are under adequate diabetic management, so the period of pre-operative care need not be unduly prolonged, but each case must be evaluated on its own basis. A suitable maintenance diet should be given, containing approximately 2 grams of carbohydrate and fat, and 1 gram of protein per kilogram of body weight. This will allow about 30 calories per kilogram —sufficient for a maintenance diet in a bed patient. For various reasons the tendency is to employ a higher carbohydrate diet at the present time. Water must be given freely and the

amounts of the intake duly recorded. The patient should be kept warm, particularly the local areas of infection and possible gangrene. The circulation must be safeguarded and all possible abnormal evidences met by suitable measures. The blood sugar should be taken to follow the progress of the treatment, and particularly for two or three days prior to the operation. This is as important as the urinalysis. In any doubtful situation the carbon dioxide-combining power is of value, but as a rule, not necessary. The same is true of the blood urea and creatinine. A higher blood sugar should be permitted in diabetics over the age of 50, since a reduction in the blood sugar in the average adult normal of 80 to 120 in older diabetics may precipitate myocardial disaster.

A most confusing situation which sometimes arises is the development of a severe ketosis, with impending coma, and the associated abdominal picture, which so closely resembles acute abdominal surgical conditions. The patient with acidosis may have all the evidence of acute abdominal disease — pain, vomiting, fever, leukocytosis and tenderness—but this symptom-complex has been so frequently emphasized that there are few now who are not alert to the diagnostic picture. The history must be carefully elucidated, the urine and blood sugar repeatedly tested, and the carbon dioxide-combining power of the plasma procured. Still more confusing is the situation when a diabetic develops an acute abdominal infection, such as an obstructive appendicitis, a perforated ulcer, or an acute cholecystitis, with a ketosis. Careful observation for a few hours, however, as a rule, aids in the distinction between the two conditions.

The type of anesthesia: Whatever disturbs respiration and the carbohydrate metabolism the least is the most efficient method of anesthesia. Naturally, local anesthesia would have first choice, then ethylene, and lastly, spinal. Ethylene produces less decrease in the alkali reserve and less increase in the blood sugar. Nitrous oxide is nearly equal in value. Spinal anesthesia is best in conditions involving the lower extremities, such as gangrene; it causes less respiratory distress and vomiting. In thyroid cases local anesthesia, supplemented with ethylene, if necessary, is of the greatest value. Ether is conspicuously a poor anesthetic, because it tends to raise the blood sugar, causes vomiting, and is prone to the development of respiratory, and occasionally renal, complications. The water loss is marked.

Ethylene gives better relaxation than nitrous oxide, and there is no disturbance in the glycogen function of the liver. There is less sweating. On the other hand, it requires greater skill in its administration. Nitrous oxide is objectionable for patients in whom there is a suspicion of cardiovascular difficulty because of the anoxemia, which may be dangerous. It is possible, too, that the reduction in the blood pressure during spinal anesthesia may in some instances have a similar effect by reducing the flow of blood to the heart muscles.

In a paper published recently by the Mayo Clinic they advise against the use of general anesthetics if they can be avoided; they give as their preference, local, spinal, nitrous oxide and oxygen, ethylene and oxygen, and lastly, ether. If the better relaxation with ether will shorten the time of operation, or reduce the surgical trauma materially, it may be preferred.

The question of insulin adminis-

tration before operation must depend upon the choice of the medical attendant and the exigencies of the situation. In the after-care of diabetic patients, oral feeding should be begun as soon as possible (usually within twenty-four hours). It may be begun by the administration of foods that are predominantly carbohydrate, such as ginger ale, glucose, lactose and fruit juice. In the post-operative care, if insulin is used, one must be on the alert for the possibilities of insulin shock.

(Read at first annual meeting of the Minnesota State Association of Nurse Anesthetists held in Duluth, Minn., June 20th, 1935.

AVERTIN ANESTHESIA—ITS CONTRIBUTION TO ANOCI-ASSOCIATION

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We note that as late as 1839 the great French surgeon, Velpeau, wrote: "To escape pain during surgical operations is a chimera for which no solution need be expected within our time." Yet this was only about three years before Long used ether in a surgical operation. I quote from a paper on anesthesia, read at the meeting of the National Anesthesia Research Society and the Congress of Anesthetists, in Ohio in 1923: "The ideal anesthetic does not exist—if it did, it would be free from danger no matter in what dosage given—have a short and pleasant induction—uncomplicated by the stimulation of the secretory glands of the respiratory tract, produce no injurious effects on any body function, furnish muscular relaxation when desired, followed by no disagreeable or serious after effects, be inexpensive — require no special apparatus and could be satisfactorily administered by anyone without training." However, in the absence of the anesthetic having all these desirable qualities, it will be necessary to make our selection from those available. Some have many of these attributes but not one as yet all of them.

From the patient's standpoint, the ideal anesthetic would be one resembling normal sleep, induced without any effort or awareness on the patient's part, one that could easily be administered in the patient's room, not expensive, and recovery from which would be as from a long normal sleep, unaccompanied by nausea and vomiting.

Of all the anesthetics coming under our observation we find avertin the most acceptable to the patient. Its cost is comparatively low, there is no expensive, complicated apparatus necessary for its administration, and the technique is simplicity itself.

We find avertin ideal for children, because the child offers no more resistance to its administration than to the taking of a temperature. Psychic shock is eliminated and the child falls asleep quickly and quietly in his bed, retaining no distressing memories of the anesthetic. If the occasion arises for a second anesthetic they frequently ask for this particular way of go-

* Read at the fourth annual meeting of the Pennsylvania Nurse Anesthetists' Association, held in Philadelphia, Pa., May 8-10, 1935.

ing to sleep. Children are quite tolerant of avertin, although we do not exceed a dosage of 90 milligrams per kilo, but use a supplemental anesthetic of either nitrous oxide or ether. Children under seven years of age do not receive a preliminary narcotic and in these cases we find the patient more or less restless immediately following the administration of the avertin. There is no period of excitement, no sense of suffocation, no irritation of the air passages, no accumulation of mucus and no post-operative vomiting unless the anesthetic supplemented is ether used over a long period of time.

In most cases, in both children and adults, there is a transitory fall in blood pressure of from 10 to 40 points, which need not be alarming, as there is no evidence of leaky skin and pallor such as accompanies circulatory shock. The face is somewhat flushed, breathing quiet, slow and regular if the air passages are not permitted to become obstructed, in which event an airway should be inserted. If the airway is not used in the operating room and the patient's reflexes have not returned before leaving the operating room, an airway is always inserted before returning the patient to bed.

All patients, whether cyanotic or otherwise, are given inhalations of a mixture of 95 per cent oxygen and 5 per cent carbon dioxide for one or more minutes before leaving the table. In all cases, to facilitate deep breathing, a few breaths of a 70 per cent oxygen and 30 per cent carbon dioxide mixture are given every four hours for a period of twenty-four hours following operation.

We have given avertin in the past five years to thousands of patients, ranging in age from nine months to eighty years and for all types of operations on the head, neck, breast, abdomen, pelvis and extremities, omitting its use in severe organic diseases of the liver and kidneys and lesions of the rectum.

One case came to our attention in which the patient (a nurse), after being given avertin became violent and hysterical, tearing her clothing, throwing off the bedding and becoming uncontrollable. When a period of twenty minutes had elapsed, inhalation ether was resorted to and the patient quieted. Later, this patient voluntered the information that she had reacted to avertin in a similar manner when this anesthetic was given her in another hospital. Notwithstanding, we have employed avertin with excellent results in the treatment and transportation over long distances of psychopathic patients. No untoward effects were observed after repeated administrations to this type of patient, or to patients afflicted with violent and prolonged attacks of hiccoughing.

Caution is always exercised in determining the dosage for elderly, debilitated and dehydrated patients, and in cases of hypothyroidism and obesity, these types requiring a relatively smaller dose of avertin. It is especially necessary to stress the importance of the anesthetic in relation to goiter. Instability of the nervous and cardiovascular systems in hyperthyroidism is an important factor influencing the selection of the anesthetic. Simple goiter presents no problem peculiar to it outside of the respiratory obstruction, but the toxic thyroid patient is one of the most unstable the anesthetist meets. Hyperthyroidism exaggerates the normal response to anesthetics in the same manner as it exaggerates normal psychic reactions in the conscious patient. Inquiry into the past history

of a patient with exophthalmic goiter will often reveal the fact that he has undergone some emotional experience, so disturbing in its nature that it has become a dominant emotional stimulant, absorbing attention during the day and disturbing sleep at night. In such a state any excitation which might produce slight apprehension in a normal individual becomes an overwhelming stimulus to the exophthalmic patient. In patients of this type the mere proposal that an operation be performed becomes a pathological excitation which may so aggravate the disease that the patient is even less able than before to make up his mind to submit to adequate treatment. The patient is surrounded by vicious circles but the dread of the anesthetic is paramount. It is evident that a patient under general anesthesia, but without the protection of local anesthesia, responds to every surgical contact. Improvement in the preparation of the patient for thyroid operations has decreased the hazard in recent years.

Fear is perhaps the most harmful of all emotions. Just as the injured body endeavors to withdraw from painful contacts, so the perception of threatened danger causes the body to be activated for escape. Fear associated with trauma may completely exhaust the organism even to the point of death. Since worry and fear may be the result of a lack of faith on the part of the patient in his own ability to protect himself from a real or fancied danger, any agent or drug which eliminates worry or fear, will prevent these body-wide stimulations and inhibitions which are really physical lesions. Avertin is our solution. We would not expect a patient approaching an operation to be on the verge of psychic shock from fear or worry when he can say on the administration of the anesthetic: "This is indeed wonderful," or "How sweet is oblivion when it comes like this!"

The complete exclusion of both traumatic and emotional stimuli will prevent the shock of surgical operations, for every stimulus, whether from trauma or emotion, predisposes to shock. For example: the sight of the operating room, awesome enough to most people even though not anticipating an operation; a word or two implying danger; lack of calm, poise and tact in the approach of the anesthetist; the taking of the anesthetic, or the instrumental injury of tissues in the course of the operation —all are injurious stimuli. By a reassuring pre-operative environment, by the dulling of the nerves by means of the administration of a narcotic, by an anesthetic acceptable to the patient, by a local anesthetic to cut off all afferent impulses during the course of operation, by gentle manipulation and sharp dissection—by the combination of all these methods, the patient is protected from damage from every factor except those which exist by reason of the diseased condition for which the operation is being performed.

An important requirement to be kept in mind when selecting an anesthetic for thyroid operations is first of all, an anesthetic that can be induced with ease and celerity. This is easily accomplished when avertin is the anesthetic of choice. Avertin being recommended solely as a basal anesthetic to be supplemented by some general or local anesthetic, we employ it only as such, generally in the 80 to 90 kilogram dosage. It is also important in the selection of the anesthetic to bear in mind the flexibility of the anesthetic in maintaining a light narcosis, and the mechanical assistance to respiration by

means of pressure in cases of respiratory obstruction and embarrassment; and last, that the anesthetic be eliminated with the least possible post-operative nausea, vomiting and restlessness. Acidosis is produced by inhalational anesthesia, being proportionate to the depth of anesthesia. The proper plane of anesthesia can be maintained at all times by the use of a basal avertin anesthesia with a light nitrous oxide and oxygen mixture, since nausea and vomiting do not result from a light gas anesthesia as is the case with light anesthesia produced by other drugs. And if the field of operation be blocked by a local anesthetic, or if the nerve connection between the brain and the injury be blocked, the physical injury alone cannot cause shock.

Summary. With proper preparation and administration, avertin as a basal anesthetic, supplemented by a light nitrous oxide and oxygen mixture and a local infiltration of one per cent novocain, more nearly approaches the ideal anesthetic for the toxic goiter. Furthermore, since a welcome feature of avertin is the state of amnesia following the operation, the events of the next twenty-four hours or more are lost to the patient. We are convinced that avertin represents a distinctive contribution in anoci-association and in the field of general surgery.

THE TRENDS IN OBSTETRICAL ANALGESIA AND ANESTHESIA

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The past hundred years have witnessed persistent attempts to accomplish the relief of pain during labor, and from the first use of ether to the present time each has met with its definite periods of success, but no one as yet seems ready to declare that a universally safe and efficient method has been proposed. There are certain definite demands which must be made of every method. It must be safe for the mother and her unborn child; it must be efficient in the alleviation of pain; it must not influence uterine contractions too markedly, and it must also be sufficiently simple in application to be entrusted to the skill and judgment of subordinates.

The choice of procedure will depend to a great extent upon facilities available, but today most hospitals are well equipped and the results with any method should be at their very best. However, the success of a technique is measured largely by the skill, intelligence, and judgment of the personnel.

Obstetrical anesthesia during labor generally means analgesia or insensibility to pain; though the pain of normal labor is seldom completely eliminated, much can be done to relieve it. Today practically all women expect and even demand that labor be made as comfortable as possible. To be able to do so is good obstetrics, and when well done gives the obstetrician great satisfaction and the everlasting gratitude of his patient.

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* Read at second annual meeting of the Texas Association of Nurse Anesthetists held in Lubbock, Texas, April 23rd and 24th, 1937.

In England there has been objection from the very first to the routine use of anesthesia in labor, and of the 7,454 patients delivered in the London hospitals in 1929 one in 8.5 received a sedative, an analgesic or an anesthetic; one in 19.5 received a sedative only; one in 18 received an analgesia only; and one in 89 received a general anesthetic (mostly abnormal cases). In 5 out of 22 hospitals light anesthesia was given to a few normal patients, mostly primiparae; in 11 hospitals analgesics were employed. All the hospitals administered a general anesthetic to abnormal cases in which intervention was necessary.

There is no doubt that the routine administration of narcotics in labor as practiced by many over-enthusiastic accoucheurs has resulted in, and is yet causing numerous deaths of newborn babies and also a certain number of maternal deaths. On the other hand, there is a real and scientifically proved ground for the scientific administration of narcotics during labor. The process of human childbirth is commonly pronounced to be a natural, harmless function, but accoucheurs know that while this may have been the original intention of nature, the modern woman can seldom be brought through the ordeal without some physical damage, and often the shock to the nervous system leaves some permanent injury. The pains of labor may be natural, but everywhere else in the human organism pain is a symptom of disease. At any rate, the modern woman cannot stand pain. It leaves its mark, for Crile has shown experimentally that such things as pain, emotions and fright cause a very definite change in the ganglion cells of the brain, therefore it is the duty of the obstetrician to reduce the suffering of labor as much as possible within the limits of safety to mother and child.

The child is also to be considered. The uterine contractions exert a pressure on the baby which often reacnes 45 pounds per square inch. The bones of the baby have been broken and even the head crushed by the action of the uterus alone. Compression of the placenta resulting in asphyxia in utero is also sometimes fatal. Narcotics, by moderating the force of the contractions, may relieve the baby from injurious pressure and preserve its life and integrity.

The history of obstetrical analgesia is quite interesting in that most of the procedures were tried first by the surgeons and later by the obstetricians. Crawford W. Long of Georgia was the first to use ether as a general anesthetic in surgery in 1842, and on January 19, 1847, Sir James Y. Simpson, Professor of Obstetrics at Edinburgh, did a version and breech extraction with ether as a general anesthetic, which was the first obstetrical procedure under general anesthesia. He found that the pains of labor might be wholly abolished without interfering with uterine contractions, and adopted the use of ether in his obstetrical practice. After its use for a few months he was not entirely satisfied because of its inconvenience in administration, its odor, and its extremely irritating quality. He then made an attempt to find a new agent which might be more pleasant to use and in his research consulted with Waldie, a chemist in Liverpool, who suggested that he use chloroform, of which chloric ether was an alcoholic solution. Chloric ether had been used previously but with little success. Simpson first used chloroform on November 7, 1847, and was very successful, finding it easy to administer, speedy in action,

and having a much more pleasant odor than ether. He then discarded ether for the use of chloroform in his obstetrical practice and immediately published a pamphlet on "A New Anesthetic Agent as a Substitute for Ether in Surgery and Midwifery."

The publication of this pamphlet was the stimulus for one of the most singular struggles of medical science during modern times. Just as there was a theological and sectarian condemnation of and opposition to inoculation and vaccination, so did the advocacy of relief of pain during childbirth meet with a vigorous storm of protest. It was denounced from the pulpit as impious and contrary to Holy Writ, and Biblical texts were numerously cited, the general declaration being that the relief of pain during childbirth was to avoid one part of the primeval curse on women. The hostility of the Scotch ecclesiastical authorities to the alleviation of pain during childbirth had its source in an old belief in Scotland. For instance, in 1591 a lady of rank, Eufame Macalyane, was charged with seeking the assistance of Agnes Sampson for the relief of pain at the time of the birth of her two sons and was accordingly burned alive on the Castle Hill of Edinburgh, and this view persisted even until the middle of the 19th century. So strong was the power of the Church and so universal was the belief in the guilt of women, that notwithstanding the fact that Simpson wrote pamphlet after pamphlet to defend the blessing he had introduced for the relief of pain during childbirth, he seemed about to be overcome when he seized a new weapon which according to White, was one of the most absurd by which a great cause was ever won. He quoted the 21st verse of the second chapter of Genesis, which is the record of the first surgical operation ever performed, and that text proves that the Maker of the universe, before taking the rib from Adam's side for the creation of Eve, caused a deep sleep to fall upon Adam. This seems to have been the stunning blow and the greatest victory of science against suffering was gained.

After the opposition had been overcome and a few prominent women had enjoyed its blessing, it became popular rapidly. It is said that Queen Victoria of England availed herself of its benefits in 1853 and 1857 and after that it was commonly known as anesthesia "a la reine" or the "Queen's chloroform." Mrs. Henry W. Longfellow is reputed to have been the first person in this country to whom chloroform was administered for that purpose.

The mode of administration of both ether and chloroform was with each pain, but since the first stage of labor, in which the most trying pains are experienced, is often prolonged, it was obviously impossible to keep a patient under or partially under a general anesthetic for that length of time, consequently the desirability of other means of carrying a patient comfortably through the first stage was evident.

It was about this time that they began looking toward gas for help, as nitrous oxide had been administered in surgery in cases which were attended with little hemorrhage. In 1868, Edmund Andrews of Chicago suggested that oxygen be given with nitrous oxide but it was left to Klikowitsch of St. Petersburg in 1880 to say definitely that a mixture of 80 per cent nitrous oxide and 20 per cent oxygen could be used in obstetrical cases. In 1881 Winkle reported 50 deliveries with favorable results. However, the gas was found at that

time to have no advantage over chloroform, as it also had to be given over a long period of time and was more expensive, consequently it was not until later years that it was used extensively.

In 1899, Schneiderlein recommended morphine combined with scopolamin for anesthesia in obstetrics. This method was eagerly grasped by the profession, for it seemed to be exactly what everyone wanted—an analgesia for the first stage which would not influence uterine contractions. There are several ways of administering this analgesia. The following was worked out at Frieburg Clinic: first, making sure the patient is in labor, with the pains 4 to 5 minutes apart and lasting 30 seconds or more, the first injection is given, consisting of $\frac{1}{6}$ grain of morphine and $\frac{1}{150}$ grain of scopolamin. Forty-five minutes later another injection of $\frac{1}{200}$ grain of scopolamin is given. After this the hypodermics are given every hour, using $\frac{1}{300}$ to $\frac{1}{150}$ grain of scopolamin, and in prolonged labors an additional dose of morphine may be given, depending upon the patient. The object is to maintain a state of amnesia, this being determined by the patient's memory. After the second injection the patient is asked if she remembers what has occurred prior to that time; if she does remember she is given another $\frac{1}{200}$ grain of scopolamin. The room should be shaded and quiet maintained. At this time suggestion to the patient is very important and while she is going into the twilight stage she should be encouraged not to cry out with the pains and to be quiet, so that she will go into the sleep more quickly and remain so throughout the entire procedure. She may be encouraged to take fluids, but foods are withheld. During the pains she will move restlessly from side to side but falls back to sleep after the pain has passed. She will respond to questioning incoherently, often forgetting to finish a sentence. When she goes into the second stage she becomes more restless and attempts to bear down and at this time she may be given chloroform or ether. The patient awakes one to six hours after delivery and if the analgesia was a success remembers nothing of her pains.

The Gauss method is different, in that each patient is individualized and carried along with the minimum dose which, to most observers' minds, is better. Polak states that until he changed to the latter method, many of his babies showed some cyanosis. The advantage of this method of analgesia as outlined by Dr. Polak is in giving each woman a thorough test of labor without reducing her physical strength by subjecting her to the nerve-racking pain of the first stage. His observations proved that the first stage was actually shortened and better preparation of the soft parts with less trauma, and less liability to intervention, consequently less sepsis.

Dr. DeLee quotes Meyers as saying that a mortality of 2 per cent in the newborn resulted from this form of analgesia. He goes further to say that the life dangers to the mother can be eliminated, but the patient must be willing to pay the price of possible laceration and hemorrhage, and possible loss of or injury to the child as the cost of her relief from suffering, while Drs. Polak, Holden and Beach observed that this method of analgesia could be used without detriment to either mother or child in properly selected cases, and also that cyanosis was the exception rather than the common finding, and when noticed, was the fault of the individ-

ual in giving it rather than the method.

In 1915 the use of nitrous oxide-oxygen anesthesia was again advocated by Webster, Lynch, and Davis. They pointed out that the modern apparatus made it possible to produce the same type of analgesia with nitrous oxide and oxygen as had previously been induced with chloroform, by giving the patient a few whiffs of nitrous oxide at the beginning of a pain and gradually replacing it with oxygen. They describe the patient as losing all sensation of pain, yet remaining conscious. They go further to say that it even stimulates uterine contractions in the second stage and shortens labor, and may be given early in the first stage and continued indefinitely without injury to the mother or child. However, Williams used this form of analgesia over a period of years and says it should be limited to the latter part of the first stage and the perineal stage rather than used over a long period of time, and this seems to be the opinion of most obstetricians who use it.

From 1924 to 1926 nitrous oxide and oxygen was fast giving way to ethylene when a gas anesthetic was requested. Ethylene was reintroduced by Luckhardt in 1922 and since then has proved to be a valuable anesthetic agent in obstetrics. However, it requires a skillful anesthetist and proper safeguards against ignition, because when mixed with air, ethylene is highly explosive. The inhalations are started toward the end of the first stage and then only when the pains are severe. The patient is given a few whiffs of a mixture of 50 per cent ethylene and 50 per cent oxygen until the height of the pain passes. The patient does not lose consciousness and the color does not change. As the second stage pains grow stronger, the percentage of the two gases is changed, that is, 60 per cent ethylene to 40 per cent oxygen; 80 per cent ethylene to 20 per cent oxygen; or 90 per cent ethylene to 10 per cent oxygen, is administered, but pure ethylene is never administered. The baby does not show asphyxia unless the analgesia has been continued for several hours. This inhalation analgesia is used quite extensively throughout the South and West. DeLee states that ethylene is comparatively safer than ether, yet all the safeguards must be observed.

Since the advocation of "twilight sleep" in 1902 nothing else had been recommended for first-stage pains which could be used to advantage until 1924, when Gwathmey developed at the New York Lying-In Hospital a method of analgesia to which he gave the name "synergistic." It was thus called because it combines the narcotic and analgesic action of morphine, magnesium sulphate and ether. To this is also added 20 grains of quinine alkaloid, and in order to get it into solution 45 minims of alcohol is added. The quinine is added to counteract the paralyzant action of the drugs upon the uterine contractions. Gwathmey states that magnesium sulphate synergizes with morphine by prolonging its effect and increasing its effectiveness 200 to 500 per cent. It synergizes with ether to decrease the amount of ether used. Part of the medication is administered by hypodermic and part by rectal instillation. When the cervix is 2 fingers dilated and with pains 3 to 5 minutes apart lasting 30 or more seconds, an intramuscular injection of 2 cc of a sterile 50 per cent magnesium sulphate solution, and ¼ grain of morphine is given; twenty minutes later another 2 cc of 50 per cent magnesium sulphate solution in-

tramuscularly, without the morphine, and at this time, if sedation has begun, the patient is left alone until the sedative effect begins to wear off, when she is given a rectal instillation containing 20 grains of quinine, 45 minims of alcohol, 2½ ounces of ether, with enough liquid petrolatum or olive oil to make 4 ounces of the solution. If no sedation is observed at the time of the second injection, the rectal instillation may be given at this time. Twenty minutes after the rectal instillation, the third intramuscular injection of the magnesium sulphate solution is given. A second or even a third instillation may be given at two and one-half hour intervals, using, however, only 10 grains of quinine with these repeated instillations. The secret of the analgesia seems to be the success in giving the rectal instillation. They should be given high and allowed to run in only between uterine contractions. If the analgesia is started late in labor and delivery is expected within an hour, the morphine is omitted and only the rectal instillation and magnesium sulphate given.

Asa B. Davis and Harrar have expressed themselves as being highly satisfied with this method, but in order to render the procedure painless a small amount of ether must be given during the second stage, and in general they regard the degree of analgesia prior to the end of the second stage as superior to that produced by twilight sleep. Williams states that he never used this form of analgesia, for he could not convince himself that it was right to use a method he could not interrupt at will; while DeLee states that he uses the method a great deal but not as routine procedure.

Just as all the other forms of obstetrical analgesia and anesthesia had their period, now the barbiturates seem to have full sway and most journals have carried numerous articles for and against this type of analgesia. The two barbiturates most used are nembutal and sodium amytal. Of these two drugs it seems to be the opinion of some men that sodium amytal produces more restlessness than nembutal; while others do not agree with this conclusion. It seems, however, that all agree that the barbiturates as a whole produce a certain amount of restlessness in all patients, more marked in some, but that this unpleasant effect is offset by the satisfactory analgesia produced by this drug.

The barbiturates may be given by mouth, rectum, or intravenously, depending upon the patient. There are numerous routines of administration to obstetrical patients and it is the consensus that it can be given with safety, as there is a large margin between the effective dose and the toxic dose.

As cases do not run by schedule in labor the time of administration varies, but like all other types of analgesics the barbiturates should not be started until labor is definitely established. When this has occurred the patient may be given a large enough dose of the drug to cause complete amnesia throughout the whole labor, without affecting the contractions except when the drug first begins to take effect, and then one will notice that the pains may become further apart for the next 30 to 60 minutes but will soon assume a regular rhythm and become more effective after the patient has relaxed.

The baby does not cry as quickly following large doses of barbiturates to the mother and respiration may not start immediately, but when the mucus is aspirated and the body warmth

is maintained the baby always starts breathing. The usual trouble with the use of barbiturates is that the doctor becomes too much concerned with the baby's respiration, and because the baby does not immediately cry out starts all kinds of artificial respiration and stimulation and does more injury to the infant than if he would only keep the respiratory passages clear and wrap warm towels around the baby. I have never seen a stillbirth caused from barbiturates.

In my practice I always use nembutal with hyoscine. As soon as labor is established the patient is given 4½ to 7½ grains of nembutal with 1/150 grain of hyoscine. Nembutal is repeated as often as is necessary, in 1½ to 3 grain doses, orally. If the patient is unable to take the drug orally, it is given intravenously. Hyoscine is repeated in 1/200 grain doses if labor is long. As soon as a barbiturate is administered to a patient a nurse is assigned to her and from then until delivery the patient is not left alone. The patient is not removed to the delivery room until she is ready for delivery, at which time she is given ethylene and oxygen by a nurse anesthetist, keeping the anesthesia at such a level as not to stop contractions but sufficient to keep her quiet. I feel that ethylene and oxygen or nitrous oxide and oxygen are far superior to ether during the second stage because the depth of anesthesia may be regulated much more quickly; also, gas does not have the depressing effect on the infant's respiration.

BLOOD PRESSURE READINGS DURING ANESTHESIA

DEAN B. SEABROOK, M.D., F.A.C.S.*
Portland, Oregon

Blood pressure is the result of three factors: the force of the ventricular contraction; the resistance of the capillaries; and the elasticity of the blood vessels. It follows therefore that any effect on any one of these factors directly affects the blood pressure.

As it is ordinarily estimated clinically by the ausculatory method, the systolic pressure represents the maximum pressure reached during systole, and the diastolic pressure the lowest recorded during diastole. One usually attaches the sphygmomanometer to the arm, pumps the pressure up to about 200 millimeters of mercury, and slowly allows the pressure to fall while listening in the cubital fossa with a stethoscope.

Five phases of sound are described in the texts, only two of which are of importance clinically:[1]

Phase I: The sudden appearance of a clear sound. This represents the criterion of systolic pressure. This sound can be heard, in certain cases, while the pressure is lowered another 15 millimeters.

Phase II: The sound becomes murmurous in character and may be heard as such for another 20 millimeters.

Phase III: The murmur changes to a banging sound which becomes pro-

*Read at meeting of Oregon anesthetists, in Portland, February 15, 1937.

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gressively louder for another 25 millimeters.

Phase IV: The sound suddenly becomes soft and muffled. The point at which the tone begins to fade is generally accepted as the criterion of diastolic pressure.

Phase V: The disappearance of all sound. By some this is regarded as the criterion of diastolic pressure. Inasmuch as in an occasional patient the sound never entirely disappears, this would seem inadvisable because of its obvious inaccuracy.

Blood pressure varies somewhat with age, but the old rule of the age plus 100 is certainly incorrect. Any pressure over 145 millimeters of mercury must be considered pathological regardless of the age. In infancy, systolic pressure ranges from 75 to 90 millimeters of mercury; in childhood from 90 to 100; from puberty on, 100 to 120; and in adult life, 110 to 145.[1] The average reading, as compiled from 500,000 life insurance examinations between the ages of 60 to 64, was 134 systolic over 87 diastolic, with women averaging 5 to 10 millimeters lower than men. One of the best indicators of longevity is a normal blood pressure, or better still, one slightly below the average. Perhaps the fact that women run lower than men is responsible, in part at least, for the fact that there are more widows than widowers.

Accurate blood pressure readings are of the greatest importance in surgical procedures requiring anesthesia, as you well know, yet I am constantly astounded by the fact that but few anesthetists regularly employ the sphygmomanometer. In spinal anesthesia a great to-do is made in regard to the blood pressure, but when ether alone is used many apparently feel the blood pressure apparatus an unnecessary and troublesome adjunct. And when the fire-engine paraphernalia that is used nowadays to administer the various ethylene, nitrous oxide, cyclopropane, ether, oxygen, carbon dioxide—and Heaven knows what else—mixtures is set up, there seem to be so many cranks to turn, so many hoses to attach, so much blowing up of rubber balloons and other mysterious maneuvers, that there is no time for blood pressure readings. Perhaps none of you deserve this criticism. I am merely trying to make forceful this point: Most surgeons would rather have a smooth anesthetic by means of the old drop ether method than a poor one with the most complicated machinery manufactured. After all, the machine can be no more efficient than the anesthetist.

I wish to remind you of the fact that straight ether has been tested and found very satisfactory over a period of many years, while many of the gases, especially the newer ones, are still really on trial. Those who know me are familiar with the fact that I employ on occasion all the latest gases but I am, as yet, doubtful about many of them. Only a span of years will place them where they belong, therefore each case in which gas or combinations of gases and ether are used should be carefully recorded, with pulse, respiration and blood pressure readings. These data are important not only for the surgeon during the operation but also that a vast amount of reliable material may be compiled for studies in mortality, toxicity, pulmonary complications and so on.

An illustration of the effect on blood pressure of capillary resistance is seen in cases with sudden increase in intracranial pressure, such as a fractured skull. As the intracranial pressure increases, i. e., as the swelling of the injured brain continues it

is compressed more and more by contact with the bony vault within which it lies. This pressure tends to collapse the vessels and capillaries, thus shutting off the blood supply to the vital centers. A compensatory mechanism now increases the blood pressure, or the pressure within the vessels, to overcome the external pressure on the vessels. Cushing has shown that as the intracranial pressure is increased by hemorrhage or edema, the blood pressure rises in step-like manner, meeting each pressure advance. Eventually, of course, a point is reached beyond which the compensatory mechanism cannot operate. When this occurs there is a sudden drop in blood pressure[2] and a sudden rise in the pulse rate, and a condition of shock obtains which is soon followed by death from cardiac or respiratory failure.

An identical situation is present during operations where the common symptom-complex known as hypertensive cardiovascular-renal disease exists. Here the vessels obstructed are the tiny afferent arterioles of the kidney. They become so filled with proliferative cells and fibrils that their lumen is almost obliterated, like the filling up of a water pipe with rust. In order to maintain kidney function blood must be forced through these tiny vessels and this necessitates the increasing blood pressure, which results in hypertrophy and enlargement of the heart. Measures to reduce blood pressure beyond a certain point defeat their own ends for if the pressure falls to normal, in all probability an insufficient quantity of blood will be forced through the kidneys, with uremia as the end result. Old people with high blood pressure due to this condition should therefore never be given anesthetics which seriously depress arterial tension. Spinal anesthesia of course is contraindicated. Pressure should be maintained during operation if possible, for if shock or near-shock is permitted for even a short time, subsequent uremia may develop and the patient may die within seventy-two hours in coma. It is well, in such cases, to start intravenous fluids on the table before shock threatens because once the peripheral vessels are collapsed it is almost impossible to get into the veins with a needle. Thus in any major procedure the best prophylaxis I know of in this regard, is intravenous glucose or acacia. When the danger is severe a 6 per cent solution of acacia is better as it remains in the blood stream for a long period of time, while the effect of glucose is often transient. In order of efficiency, intravenous solutions for this purpose might be listed as follows: whole blood, acacia, glucose and normal saline.

Ephedrine, according to most authorities, is helpful in maintaining an adequate blood pressure, but adrenalin is so transitory in effect as to be of little value except in an attempted resuscitation. The Trendelenburg position, binding the limbs and abdomen, or stimulants such as caffeine, coramine, lobeline, et cetera, all have their advocates. Camphor in oil, an old favorite, is seldom used at the present time, although some of the older anesthetists swore by it. Personally, I feel it has no value.

Carbon dioxide in inadequate amounts, that is, over-oxygenation, causes marked lowering of the blood pressure in animals and a similar effect in man, though to a lesser degree. A slight rise can be secured by carbon dioxide excess. Lowering the carbon dioxide tension below normal causes constriction of the blood vessels of the skin and the patient becomes pale

and cold. Carbon dioxide excess results, on the other hand, in vasodilatation, and the skin becomes suffused and hot.

Anoxemia results in lowered blood pressure after about one minute, sometimes to a marked degree, probably owing to heart muscle failure. Sometimes there is transient and inconsequential rise immediately after the onset of anoxemia.

There may be some change in blood pressure during the various phases of respiration—an increase during inspiration and decrease during expiration. Over-distention of the alveoli, as in emphysema, usually causes a high pressure in the pulmonary circuit and throws a great load on the right chambers of the heart. A chronic emphysema or pulmonary arthropathy often results in tremendous right heart hypertrophy — the so-called cor pulmonale, which is the counterpart of the left heart hypertrophy as seen in hypertensive cardiovascular-renal disease. Thus thick-chested or barrel-chested individuals are more prone to right heart failure than persons with flat or normal chests. Asthmatics are dangerous subjects because they are all emphysematous and are therefore liable to increased pressure in the pulmonary circuit. Right heart failure is all too frequent a complication, the patient dying of edema of the lungs and right heart dilatation rather than with a true pneumonia or an atelectasis.

To cover the entire subject in one short paper is manifestly impossible; I have only touched upon some of the high spots. The importance to the anesthetist of blood pressure readings should be evident from these few remarks however, and I am sure the members of a progressive group such as this will not fail to do their part in keeping careful records of each anesthesia given. Each complete case record means much to your own development and to the advancement of the science af anesthesia.

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CYCLOPROPANE IN ORTHOPEDIC SURGERY

ZELLE SLASOR

St. Luke's Hospital, Kansas City, Mo.

During the past year we have been using cyclopropane-oxygen anesthesia in orthopedic surgery at St. Luke's Hospital, and have found it to be the anesthetic of choice for this type of work.

Premedication

One hour before coming to surgery the patient is given a hypodermic of ⅛ to ⅙ grain of morphine and 1/300 to 1/200 grain of scopolamine, according to the age and size of the patient. For children over six years of age a hypodermic of ¼ to 1 grain of codeine and 1/500 to 1/300 grain of atropine is given. Under six years of age no hypodermic is given and drop ether is used.

Technique of Administration

Upon arrival in the operating room the patient is transferred to the operating table and the anesthesia is started immediately. We use a modern gas machine equipped with the circle filter. The breathing bag is filled with oxygen and the mask is applied to the face. When the mask is comfortably adjusted 1000 c.c. of oxygen and 500 c.c. of cyclopropane per minute are allowed to flow into the bag. As soon as deep and regular respiration is established, the carbon dioxide filter is turned on and this mixture is permitted to flow until consciousness is lost and relaxation takes place. As soon as the patient's eye remains quiet and the respiration is smooth and regular, the cyclopropane is turned off and the oxygen flow is reduced to about 200 c.c. The patient is then prepared for operation.

Just before the incision is made the cyclopropane, at the rate of 300 to 400 c.c. is again added, and the oxygen is increased to 800 or 900 c.c. for a very short interval, then the cyclopropane is turned off and the oxygen reduced to 200 c.c. per minute. At the end of 20 to 30 minutes it is usually necessary to add a little more cyclopropane, always increasing the oxygen in the proportion of at least two-thirds. It is very easy to produce an overdosage, therefore the pulse, respiration and eye signs must be watched closely. If the respiration becomes shallow, the carbon dioxide filter should be turned off until the respiration becomes deeper, and the filter is then turned on one-half until the desired depth of respiration is obtained.

The mask should be air-tight at all times. In some operations the position is such that the eye cannot be seen without disturbing the mask, therefore pulse and respiratory signs are the only guides. The pulse rate is usually slower in cyclopropane-oxygen anesthesia than with other gases. During the operation the pulse remains normal or a little below normal in rate. There is a slight rise in blood pressure throughout the operation. The respirations are slower and the depth is controlled by the carbon dioxide filter. Respirations must not be allowed to become shallow, and no cyanosis from obstruction of the upper respiratory passages must be tolerated. Ether has not been added to any cyclopropane-oxygen anesthesia in this clinic, and when given properly the patient has remained relaxed and in good condition.

When the operation is completed the carbon dioxide filter is turned off and fresh oxygen is added for a minute or two. The patient is lifted directly from the operating table to his bed and by the time the patient reaches his room he is usually awake. The average time required for regaining consciousness is about five minutes. Nearly fifty per cent of the patients vomit upon awakening and about fifty per cent vomit perhaps once or twice during the first five or six hours after the operation, but do not complain particularly of nausea. After the patient is returned to the ward a hypodermic of morphine or codeine is given, which not only prevents undue restlessness but tends to lessen to a great extent post-operative nausea and emesis. During the past year five highly nervous patients have remained nauseated into the day following operation. Some of the patients however may be given a light diet the afternoon or evening following the operation.

THE HUMAN EQUATION IN ANESTHESIA

IRENE MASON

Greenville, Miss.

Recently I heard a person who had just recovered from a major operation and who had been well pleased with her anesthesia, make the remark that she had heard that the new gas machines were now so perfect that they were really fool-proof and that almost any one could give a good anesthesia. To those of us who have worked and struggled and given so much of our energy to securing a smooth, successful anesthesia and who know just how much it means to both the patient and the surgeon, such a remark naturally comes as a shock, and it is in this connection that we are led to think of the human equation in anesthesia. When the human element enters into any procedure then the slide rule formula is eliminated. If people were like machines and could be counted upon to act in the same way at all times under like conditions, then we might have a fool-proof machine by means of which a perfect anesthesia could be given. But unfortunately such is not the case, as the human factor is a very uncertain element with which to deal.

In reckoning with the human side of the work of giving anesthetics there are two angles which must be considered: the human element, or nature of the patient, and the human disposition and character of the person who is giving the anesthetic. Let us first consider the subject from the complicated angle of the patient.

It must not be assumed that there is any one rule or magic scheme which will fit one method of anesthesia or a single anesthetic drug to every patient. Since the patients are wholly different, the cloth must be cut to fit each individual case. A human being is not a mere automaton, and it will readily be seen that anesthesia cannot be conducted on the physiological basis alone but that the psychological aspect of the case is equally important. The patient's peace of mind deserves as much consideration as his physical well-being. He is usually apprehensive as to whether he will be unconscious and will not feel any pain. In fact one of the most common requests made before the mask is applied and one with which I am sure you are all familiar, is that the surgeon not be allowed to start the operation until the anesthetist is sure that the patient is sound asleep. Psychic shock can be very serious and for this reason preliminary medication should be begun from three to twelve hours before operation with the idea of eliminating fear and apprehension. The medication should be so timed that it will become effective before the beginning of the administration of the anesthetic, as the patient is entitled to the benefit of any harmless medication which will make the ordeal of surgery less terrifying. Patients vary greatly in their susceptibility to medication, consequently there should be a careful study of blood pressure, pulse, respiration, size, age and color to determine what depressing effects the preliminary medication may have had, and this should be known before the anesthetic is started. An increasing variety of drugs of the hypnotic group are being employed, and while such drugs have little or no effect on the perception of pain they do defin-

itely decrease the amount of the anesthetic agent necessary to secure the desired state of anesthesia, and also make the induction less difficult. With such preparation there is no struggling or feeling of suffocation and the patient approaches the operation in a calm state of mind. Adequate and thorough pre-operative medication brings the patient to the operating room in the most advantageous state of mind, and the greater the care taken to put the patient in good pre-operative mental and physical condition the greater are the chances of giving a successful anesthesia. Patients should not be hurried to the surgery and preliminary pre-operative care should entail rest, the bolstering of a possible failing cardiac system, replenishing any lack of fluids in the system, and other measures that tend to bring the patient to the operation in the best possible condition.

The type of operation, the different stages of the operation and the different types of patients each have their bearing on the end result, and each patient presents an individual anesthetic problem. In the obese with short necks there is more danger of respiratory failure; chronic alcoholics and drug addicts are merely stimulated by nitrous oxide and ethylene and more must be used to secure anesthesia; and the highly excitable or nervous patient requires more of the anesthetic agent to produce the desired relaxation. The age of the patient is of great importance, as the most serious form of heart disease to be considered in anesthesia is that occuring in old age. Because of the hardening of the arteries the heart muscle is more susceptible to any lowering of the oxygen content of the blood, and cyanosis in the old is therefore more dangerous than in the young. Old people will not tolerate a deep anesthesia. The very young require a different type of anesthesia and their problem must also be given special consideration.

The toxic goiter patient, the septic patient, the patient with anemia, or the patient with high temperature, requires more oxygen and is much more susceptible to anoxemia. Gas-oxygen raises the blood pressure and it is therefore the best anesthetic agent for the weak and hypotensive patient, but is contraindicated in those with severe hypertension.

No more anesthetic should be given than each individual and condition requires. The site and character of the operation control the method and depth of the anesthesia. A breast amputation requires less relaxation, with less anesthetic, than an abdominal operation; work in the upper abdomen necessitates greater relaxation than work in the pelvis, and the closure of the peritoneum is often difficult, therefore the patient should be thoroughly relaxed at that time to prevent straining with a consequent prolonging of the operative procedure. Each additional minute that a patient is under anesthesia is of vital importance and an unnecessarily prolonged anesthesia may mean a great deal to the welfare of the patient.

According to Finney, the most notable contribution to anesthesia in recent years has been the service of the skilled anesthetist and not the particular drug. The inventors of the mechanical apparatus have put at our disposal suitable and efficient machines for the administration of the anesthetic agents but the mastery of the mechanical technique is the least part of the necessary training in anesthesia. The administration of anesthetic drugs requires the highest type of skill. The anesthetist watches

the patient constantly and must be competent to recognize any approaching danger signs. This anticipation of danger may save a patient's life when a serious operation is in progress. Though the surgeon has the utmost skill, he relies on the anesthetist to report any untoward change in the patient's condition, and unless he feels that he can rely on the ability of the anesthetist he cannot give his best services to the patient.

Easy as it may seem to the bystander who watches the giving of a smooth, quiet anesthesia, it entails a responsibility and a strain that can be realized only by one who has had the experience. Whether the case is a simple one or one of many complications the responsibility of the anesthetist is the same. The anesthetist who through timidity fails to give an anesthesia of sufficient depth and consequently throughout the whole operative procedure is confronted with a straining, struggling, nauseated patient is as much a failure as the anesthetist who through lack of knowledge or judgment carries her patient beyond the depth of anesthesia needed for the operation, and either procedure may be equally harmful to the patient. Not every person who has had a three-year course of training in nursing is capable of becoming an anesthetist. A good anesthetist must not only be competent but she must be conscientious, appreciating the great responsibility that is placed in her hands. She should be a person with a calm, even disposition, not easily excited or upset. She should possess keen powers of observation, an alert mind and good judgment. She should have an understanding of human values and tact in dealing with all classes of patients. She should be interested in human nature and able to sympathize with those who are weak and nervous, businesslike with those who demand efficiency and diverting with children who are terrified and feel that when they enter the surgery they have been deserted by their last friend.

The public has long associated anesthesia with unpleasant features, which attitude of mind of course is no longer necessary. The anesthetist should increase her contacts with patients before and after operation, and explain to them something of the nature of present-day anesthesia and the methods now used to add to their comfort and safeguard their well-being. An understanding sympathy combined with a frank explanation of what is to be done will almost always call forth intelligent cooperation from the patient. The chief functions of the anesthetist during the operation are to control the patient's pain, to maintain the proper amount of relaxation during the different stages of the operation, and by so doing provide as nearly as possible the optimal conditions for the accomplishment of the operation and to guard against any untoward results during the operative procedure. It is only by a combination of knowledge and experience that an anesthetist can give her patients this optimal result.

I was very much impressed recently by an article in which the writer, a most capable anesthetist (as evidenced by the position she holds as director of an excellent school of anesthesia) stated that she never approached the giving of an anesthetic without some degree of fear and because it is a matter of life and death she sincerely hopes this feeling will never leave her. I have always had that feeling of slight fear just before beginning an anesthetic and I have wondered if it were a lack of confidence in my own ability which made

me have that feeling, but I have been given a new confidence in my work by knowing that another, especially one whom I know has reached such a pinnacle in her profession, is still experiencing such an emotion.

In our daily cares as anesthetists we must keep the faith, eagerly and earnestly striving to perfect our work, and at all times bearing in mind the welfare of our patients, who as human beings have so trustingly put themselves into the hands of other human beings.

REVISED REPORT OF THE EDUCATIONAL COMMITTEE

RECOMMENDATIONS REGARDING SCHOOLS OF ANESTHESIA FOR NURSES

TYPE OF INSTITUTION

Schools of Anesthesia should be established in only those hospitals which have an active surgical division, embracing practically all types of surgical cases. The institution, to be suitable, should employ expert anesthetists who are qualified instructors; and should provide proper kinds and amount of equipment and other facilities necessary for teaching this subject.

Obviously, unless the hospital management takes a genuine interest in the school, and is cognizant of the vital work of the anesthetist, there is little likelihood that the school could function in a truly satisfactory manner, with adequate teaching staff, suitable equipment, class rooms and other teaching facilities necessary for a well-rounded course of instruction.

When so located physically as to make it possible, the School of Anesthesia should strive through University affiliation to secure the benefits which Universities have extended to other professional groups. Such University recognition and affiliation should eventually result in broadened facilities, both practical and cultural.

ANESTHESIA DEPARTMENT PERSONNEL

Chief Anesthetist The person who is to direct the actual training of the nurse anesthetist should have a personal, intimate understanding of the practical problems of this special type of training. Experience has proved that the most effective person for this office is the nurse anesthetist with a special interest in teaching and in the broad future of the work. Naturally this chief anesthetist should have a sound educational background, and a vision for the future; ambitious to not only maintain standards which have already been established, but also to develop new teaching policies and methods of instruction in keeping with ever-progressing times. She must be thoroughly familiar with, and personally expert in, the administration of anesthetics, and qualified to teach both the theory and the practice of her subject. She should have had at least five years of continuous experience as an active anesthetist, and should have an inclination for study and constantly supplement her knowledge by this means as well as by continuous clinical observation.

Instructors Each assistant anesthetist on the staff should be selected with regard to both her knowledge of her subject and her ability to communicate this knowledge to, and work successfully with graduate students; and it is important that this staff be so selected and so instructed that it will unvaryingly correlate in practical administration (with the students) the exact technique of administration which is established in that school. To facilitate this,

weekly conferences of the instructors are recommended, for discussion of problems in teaching and to keep in full vigor this unvarying coordination of technique.

While experience has amply demonstrated the fact that both theoretical and practical training in anesthesia may be delegated in its entirety to the nurse anesthetist, still in the larger clinics, particularly in the University centers, it might be desirable to supplement this instruction with lectures in physiology and pharmacology by staff members of the Medical School.

Direction Because of its relationship to surgery, the Department of Anesthesia should function directly under the Chief Surgeon; excepting that in those hospitals where all of the professional departments are responsible to the Medical Director, the Department of Anesthesia would properly come under his direction. Only these heads of staff are in a position to be familiar with the actual problems of the service, and to properly direct the Department of Anesthesia to the good of the service, the school and the students.

It is important however that the assignment of cases be made by the Chief Anesthetist, and not by the Resident in Surgery or the Surgical Supervisor.

EQUIPMENT

A School of Anesthesia engages to fit its students for skilled service in hospitals of whatever kind in any part of the country. In view of the different kinds of anesthetizing equipment met with in various institutions, it is necessary that students receive a broad instruction on and practical experience with, widely varied kinds of anesthetizing apparatus, so that they may be thoroughly qualified to effectively dispose of commonly met with mechanical manipulation and maintenance problems.

While in essential principles the leading makes of anesthetizing machines are quite similar, yet their manipulating mechanisms vary so considerably from one another that it is highly essential that a school have at least three representative makes available for student use and study, to familiarize the student with the fundamental principles which underlie all the machines, and equip her to skillfully operate and maintain whatever types she may come in contact with in the field.

PERMANENT RECORDS

A complete system of permanent, uniform records of the student's progress during her course should be maintained, this record comprising grades obtained in the various subjects, hours of actual class room theoretical instruction, hours of "class period" practical instruction, hours of practical anesthesia and number of anesthetics administered during her course; together with information concerning the health, character and personality of the student.

TECHNICAL LIBRARY

A School of Anesthesia should make available to its students a technical reference library, containing at least standard late edition text books on this exact subject. The following text books, periodicals and monographs are recommended when available:

Current Researches in Anesthesia & Analgesia
British Journal of Anesthesia
Journal American Medical Association
Gwathmey's "Anesthesia"
Hewitt's "Anesthetics and their Administration"
Flagg's "The Art of Anesthesia"
Cushny's "Pharmacology and Therapeutics"
Sollmann's "Manual of Pharmacology"

Haldane's "Respiration"
Henderson & Haggard's "Noxious Gases and Principles of Respiration"
Peters & Van Slyke's "Qualitative Clinical Chemistry"
Lunsgaard & Van Slyke's "Cyanosis"
Wiggers' "Modern Aspects of Circulation in Health and Disease"
Poe's "Modern General Anesthesia"
Blomfield's "Anesthetics in Practice and Theory"
Hewer's "Recent Advances in Anesthesia & Analgesia"
Levy's "Chloroform"
Hatfield's "Practical Anesthetics"
Ross & Fairlie's "Handbook of Anesthetics"
Peeble's "Graphic Anesthesia Chart"
Buxtons' "Anesthetics"
Starling's "Principles of Human Physiology"
Howell's "Text Book of Physiology"
Wiggers' "Physiology in Health and Disease"
MacLeod's "Physiology and Biochemistry in Modern Science"

DURATION OF COURSE

Very important factors in this connection are not merely the calendar length of the course, but also the activity of the surgical service in the hospital housing the school, the amount and kind of material made available to the student during her course, and especially the type and amount of personal instruction that she receives during the training. Best opinion today is that under favorable circumstances of teaching, activity of surgical service and efficient school organization, the minimum time within which it is practical to fit the necessary instruction, subject matter and experience, is six months; and it is recommended therefore that six months be the minimum acceptable period, with a one-year course advocated.

The general trend in all branches of scientific education is to lengthen the duration of courses, both in the interest of fuller training and of raising the standard by restricting entrants. From an economic standpoint (the number of anesthetists in active practice and the need of fullest experience and qualifications of new workers in the field) it seems desirable to protect the future of the work by reducing the number of workers and by raising the standards of all, and thereby automatically restricting the number of new entrants to the field. The general tendency is therefore toward lengthening the period of training.

REQUIREMENTS FOR ADMISSION

Particular emphasis should be laid upon the candidate's qualifications for the work, before acceptance for enrollment for a course in anesthesia. It is not always possible to personally interview the applicant, and when it is, her suitability for the work cannot always be so easily determined. A study should therefore be made of certain data regarding the applicant before admission to the course.

Education It is recommended that four years of high school prior to nursing course, be considered a minimum for acceptance. College entrance credits are advocated. Only graduates of accredited Schools of Nursing, having passed required state board examinations, should be accepted.

Age Due to the character of the work involved, and the responsibilities devolving in practice, 24 years of age should be the minimum acceptable. A maximum age limit should be set at 35 years. While exceptions may develop, experience has shown the undesirability of admitting for training students beyond that age.

References Before a candidate is accepted for enrollment, references should be secured from the Superintendent of the Training School for Nurses from which she was graduated, including when possible a transcript of grades obtained during her training in nursing.

References should be also obtained from two physicians with whom the applicant has been associated, and who are acquainted with her physical condition and probable aptitude for the work.

A personal interview with the applicant is also desirable, when practicable, and a photograph of prospective student should be secured.

Health Each student before actually beginning the course should be given a physical examination by a member of the hospital staff. It is recommended that this examination include specifically an X-ray of chest. Several positive findings in different schools amply justify this procedure.

LIMITED SIZE OF STUDENT BODY

The number of students admitted to the course in any School of Anesthesia should be strictly limited to that number which by reason of the activity of the surgical service can make available to each student the full required number and kind of cases during her period of instruction. No student should be graduated who has not had a total of at least 275 cases during her course, (25 of which may be dental cases) and no school should accept students beyond the number that can be given at least the minimum number of suitable kinds of anesthetic cases during her regular period of training. In addition to the foregoing, each student should administer at least twenty-five obstetrical anesthesias and analgesias. A recommended twenty-five additional cases may consist of spinal, sacral or local anesthesias. The foregoing totals 325 cases as a minimum.

UNIFORM TEACHING

A curriculum to carry measurable value must be rigidly adhered to, otherwise groups trained at different periods in the same institution would receive varied instruction. Definite provision in this regard is necessary when students or classes are started at various times during the school term. For instance, when the size of teaching staff and length of course in an institution is such that bi-monthly or tri-monthly starting classes cannot be avoided (in order to continuously have available a proper number of experienced anesthetists), the teaching should be so organized that each student unfailingly receives the full number of class room hours, and hours of practical instruction in specific "class period" subjects. This repetition of classes naturally puts an added strain on the teaching staff, but when all is said and done it is merely a matter of proper organization at the beginning; and there should never be any compromise on this phase.

In practice, even with a properly organized course, it will be difficult at times to adhere strictly to full class room instruction in the announced subjects; but it is urged that such emergencies be met squarely and the necessary extra provision made, and no tendency permitted to supersede specific class room work by contracted compromise "lectures" in the operating room or during case administrations.

CLASS INSTRUCTION IN THEORY

The number of hours of teaching of theory outlined in any course should represent actual hours of class room instruction, and should not include the hours utilized in discussion during administrations, or during duty in the operating room. It should represent what its title implies, "hours of definite instruction in the class room."

CLASS OPERATING ROOM INSTRUCTION

The number of hours of operating room instruction should represent actual class-period hours of instruction in the operating room on specific subjects

(machines, equipment, records, department organization, et cetera) and should not include hours spent in routine conduct of the department, or in administration of cases.

PRACTICAL INSTRUCTION

The number of hours of practical instruction included in any course, will represent the remaining hours on duty in the department for the duration of the course—observing, discussing practical problems with instructors and fellow students, studying cases, administering anesthetics, et cetera. The total hours will vary proportionally with the length of the school course.

PATTERN OF TEACHING

Since the pharmacological effect of the different anesthetics is so different upon certain functions, (for instance the dissimilar effects of ether versus chloroform upon respiration, or of nitrous oxide versus avertin upon blood pressure) and since therefore the pharmacology of each anesthetic is a particular rather than a general subject, it is recommended that the pharmacological effects of the various anesthetic agents be taught as a part of the description of each anesthetic agent itself, rather than under a generalized heading.

EXAMINATIONS

While difference of opinion exists as to the relative merit of "quiz periods" versus regular examination periods, it is the considered opinion of this committee that in addition to daily or weekly "quiz-conferences," definite *written* examinations on each subject taught are not only desirable but necessary to appraise a student's grasp or knowledge of that particular subject. Under this method a student is afforded opportunity for further instruction and study in those subjects which her examinations show her to be in need of. It is recommended that these written examinations be held at the conclusion of the lectures on that individual subject or unit, and that the student's grades for these examinations be made a part of her permanent record. A final examination at the end of the course, reviewing the ground covered by the course, is also desirable.

DISCUSSION GROUPS

Discussion periods are valuable for advanced students; a senior student preparing a paper concerning her observations, or on some anesthetic subject of her own choosing, the paper being discussed in conference with all the students and the instructors. Such discussion conferences encourage development of powers of observation, self-expression, originality of thought and initiative. They should not, however, be permitted to take the place of definite scheduled class room and operating room instruction in specified subjects.

TIME OFF DUTY

This is a subject which merits careful consideration and provision. The best teaching is of little avail if a student comes to instruction after unusually long hours of duty under extreme physical, nervous and mental strain.

If after a student has spent an active morning in the operating room, followed by routine apparatus cleaning, she is hurried off to class instruction lasting one to two hours, she may from sheer weariness develop a growing dislike for study. It is recommended that class periods be so arranged that students may be given a rest period just prior to them.

While supplemental night duty for supervised students is in some cases necessary, experience has shown that if this night work be permitted to become very heavy, the student is not able to realize the full benefit of the instruction given her. There is grave question if any anesthetist can remain mentally or physically capable of good work, if her hours on duty average more than eight daily.

FIELD TRIPS

It is highly desirable that field trips to other hospitals be arranged for the student.

ORDER OF TEACHING SUBJECTS

The order of teaching curricular subjects will naturally vary with the institution, according to the anesthetic in major use. For instance, where ethylene combinations constitute the anesthetic of chief use, the teaching of ethylene would precede the teaching of nitrous oxide.

Quite in line with these minor rearrangements of subjects within the body of the course, it is recommended that subjects be taught in an order which will synchronize with the student's observed experiences—for instance, at the beginning of the course, "Objective symptoms" (signs of anesthesia) and the practical operation of the major anesthetizing machines in use, equipment, et cetera.

The curriculum which will now be recommended in this report has been arranged in a purposeful order, attempting to teach to the student at the beginning of her course those subjects which will be most necessary and useful in her earlier practical contacts in the operating room, passing then to subjects which become more readily assimilable in the light of increasing experience.

RECOMMENDED CURRICULUM

CLASSROOM INSTRUCTION

(1) Objective symptoms (signs of anesthesia)
   - (a) Respiratory signs
   - (b) Color signs
   - (c) Blood pressure signs
   - (d) Pulse signs
   - (e) Muscular signs
   - (f) Eye signs

(2) Pressure regulators, valve mechanisms, et cetera

(3) Manipulation of principal anesthetizing machines

(4) Computing percentages of gas mixture deliveries

(5) Positions for various operations; changes of posture, transference of unconscious patients; posture paralysis

(6) Physical management of patients

(7) Psychology in anesthesia

(8) Pre-operative care

(9) Post-operative care

(10) *Ether*
   - (a) History of discovery, and its development as an anesthetic
   - (b) Simple chemistry, and physical characteristics
   - (c) Pharmacological effect upon the
     - (1) Respiratory system
     - (2) Circulatory system
     - (3) Nervous system
     - (4) Glandular system
     - (5) Muscular system
   - (d) Specific objective symptoms (signs) identifying the stages of anesthesia under this agent
   - (e) Treatment of respiratory arrest, circulatory arrest and resuscitation

(f) Concentrations (partial pressures), absorption and elimination

(g) Methods of administration:—
- (1) Open drop
- (2) Semi-open drop
- (3) Valvular mask
- (4) Oral insufflation
- (5) Nasopharyngeal insufflation
- (6) Oropharyngeal insufflation
- (7) Naso-endotracheal insufflation
- (8) Oro-endotracheal insufflation
- (9) Oro-endopharyngeal inhalation
- (10) Oro-endotracheal inhalation
- (11) Oil-ether colonic

(h) Special techniques of administration for particular types of surgery (alone and in sequences)

(i) Indications and contraindications

(11) *Nitrous Oxide*

(a) History of its discovery, and its development as an anesthetic

(b) Simple chemistry and physical characteristics

(c) Pharmacological effects upon the
- (1) Respiratory system
- (2) Circulatory system
- (3) Nervous system
- (4) Glandular system
- (5) Muscular system

(d) Specific objective symptoms (signs) identifying the stages of anesthesia under this agent

(e) Concentrations (anesthetic versus asphyxial)
- Nitrous oxide with oxygen
- Nitrous oxide with air
- Nitrous oxide alone

(f) Methods of administration:—
- (1) Valvular mask (face and nasal)
- (2) Endo-oropharyngeal
- (3) Endo-nasopharyngeal
- (4) Endotracheal (inhalation)

(g) Specific techniques of administration for particular surgical procedures (Nitrous oxide-oxygen alone and in sequence with ethylene, ether, et cetera)

(h) Indications and contraindications

(12) *Oxygen—Asphyxia*

(a) Simple chemistry of oxygen and physical properties

(b) Pharmacological effects upon the
- (1) Respiratory system
- (2) Circulatory system

(c) Concentrations (oxygenating verses anoxemic)
- (1) In normal atmosphere
- (2) In anesthetic mixtures
- (3) In stages of anoxemia
- (4) In cyanosis
- (5) Pathological

(13) *Oxygen Therapy*

(14) *Carbon Dioxide*

(a) Simple chemistry and physical characteristics

(b) Pharmacological effects upon the

(1) Respiratory system
(2) Circulatory system
(3) Nervous system

(c) Concentrations (stimulating versus toxic)

(d) Techniques of usage

(15) *General Anesthesia for Children*

(16) *Anatomy of the Lungs and Physiology of Respiration*

(17) *Mechanical Respiratory Obstruction—Prevention, Correction, Pathology*

(18) *Anatomy of the Circulatory system, and Physiology of Circulation*

(19) *Surgical Shock*

(a) Theories of cause
(b) Symptoms
(c) Treatment

(20) *Ethylene*

(a) History of discovery, and development as an anesthetic
(b) Simple chemistry, and physical characteristics
(c) Pharmacological effects upon the

(1) Respiratory system
(2) Circulatory system
(3) Nervous system
(4) Muscular system
(5) Glandular system

(d) Specific objective symptoms (signs) identifying the stages of anesthesia under this agent

(e) Concentrations

(f) Methods of Administration:

(1) Valvular mask
(2) Endo-oropharyngeal
(3) Endo-nasopharyngeal
(4) Endotracheal (inhalation)
(5) Soda lime filtration

(g) Techniques of administration

(h) Indications and contraindications

(i) Fire hazard; explosive concentrations; precautions

(21) *Cyclopropane*

(a) History of discovery, development as an anesthetic
Simple chemistry and physical characteristics

(b) Pharmacological effects upon the

(1) Respiratory system
(2) Circulatory system
(3) Nervous system
(4) Muscular system
(5) Glandular system

(c) Specific objective symptoms (signs), identifying the stages of anesthesia under this agent

(d) Techniques of administration:

(1) Valvular mask (soda lime absorption)
(2) Endotracheal inhalation (soda lime absorption)

(e) Concentrations (anesthetic versus toxic)

(f) Resuscitative measures
(g) Indications and contraindications
(h) Fire hazards; precautions

(22) *Obstetrical Anesthesia and Analgesia*

(23) *Preanesthetic Medication and Basal Anesthetics*

(24) *Chloroform*

(a) History of discovery, and development as an anesthetic
(b) Simple chemistry, and physical characteristics
(c) Pharmacological effects upon the
(1) Respiratory system
(2) Circulatory system
(3) Nervous system
(4) Muscular system
(5) Glandular system
(d) Specific objective symptoms (signs) identifying the stages of anesthesia under this agent
(e) Techniques of administration:
(1) Open drop
(2) Oral insufflation
(f) Resuscitative measures
(g) Indications and contraindications

(25) *Ethyl Chloride*

(a) Simple chemistry, and physical characteristics
(b) Pharmachological effects upon the
(1) Respiratory system
(2) Circulatory system
(3) Muscular system
(4) Glandular system
(c) Specific objective symptoms (signs), identifying the stages of anesthesia under this particular agent
(d) Techniques of administration:—
(1) Open drop (or spray)
(2) Closed (valveless mask breathing bag)
(e) Indications and contraindications

(26) *Newer Anesthetics (Divinyl Ether, Evipal, et cetera)*

(27) *Spinal Anesthesia*

(28) *Local Anesthesia*

(29) *Ethics in Anesthesia and Importance of Specialized Training*

(30) *History of Anesthetic Development*

(31) *Assigned Readings (Class room periods)*

(32) *Major thesis*

Supplementing the foregoing periods of class room teaching, it should be required that definite practical instruction in specific subjects be given in the operating room, on a "class period" schedule, entirely outside of routine operating room activities and exclusive of the time spent in observation, conduct of cases, et cetera. The following is recommended:

OPERATING ROOM INSTRUCTION

(1) Introduction to operating rooms, clinics, departments of institution
(2) Demonstration of masks, airways, catheters and other accessories, with instruction in their care

(3) Instruction in mechanical manipulation of anesthetizing machines; gas inhalation (both standard and soda lime), ether insufflation, suction, et cetera

(4) Practical instruction in taking blood pressure

(5) Instruction in interpretation of patient's anesthetic chart and progress notes, indicative of patient's condition pre-anesthesia; charting pulse, blood pressure and respiration during anesthesia; progress notes post-anesthesia; routine transcription of institutional anesthetic records

(6) Instruction in regard to department supplies, equipment, et cetera

HOURS OF INSTRUCTION

It is recommended that at least 95 hours of definite class room teaching and 18 hours of specific-subject instruction in the operating room be given, (an unvarying total of 113 hours of organized teaching)

RECAPITULATION

It is recommended that Schools of Anesthesia, whose graduates are to merit highest rating by the National Association of Nurse Anesthetists, give to their students a training both theoretical and practical which is equivalent to the curriculum above set forth in this report; and that minimal standards be:

Length of course—six months (with one year advocated)

Hours of recorded "class room instruction,"—95

Hours of recorded "operating room class instruction,"—18

Number of cases administered—325.

Of this accredited 325, at least 250 must be general surgical; 25 should be obstetrical; 25 may be dental; 25 may be divided between spinals, locals, et cetera.

HELEN LAMB, *Chairman*
OLIVE L. BERGER
MAE B. CAMERON
MABEL HARD
MARY H. MUELLER

ACTIVITIES OF STATE ORGANIZATIONS

CALIFORNIA

The third annual meeting of the California Association was held March 2nd, 1937, at St. Mary's Hospital, San Francisco, Calif. Twenty-one members were present.

Charles Mathe, M.D., of the urological staff of the French and St. Mary's Hospitals, gave a very interesting lecture on the surgical treatment of kidney cases.

The following officers were elected for 1937:

President	Mrs. Mary J. Roche Stevenson Franklin Hospital, San Francisco, California
Vice-President	Mrs. Katherine Graham San Francisco Hospital, San Francisco, California
Secretary-Treasurer	Mrs. Gay Morgan 807 — 39th Avenue, San Francisco, California

Trustees:

3-year Edith Jones
St. Francis Hospital, San Francisco, California

2-year May Malamphy
Southern Pacific Hospital, San Francisco, California

1-year Sarah Rausch
Mary's Help Hospital, San Francisco, California

MINNESOTA

The third annual meeting of the Minnesota Association of Nurse Anesthetists will be held at Rochester, Minn., May 13th, 14th, and 15th, 1937, in conjunction with the Minnesota Hospital Association. The program is as follows:

Thursday, May 13th.

2:00 P.M. Registration
4:00 P.M. Meeting with Anesthesia Journal Club of the Mayo Clinic
7:00 P.M. Buffet Supper and Reception by City of Rochester

Friday, May 14th

9:00 A.M. General Session

Miss Anna Willenborg, St. Joseph's Hospital, Chicago, Ill., representing National Association of Nurse Anesthetists

12:30 P.M. Luncheon—Nurse Anesthetists

2:00 P.M. Greeting
A. F. Branton, M.D., President,
Minnesota State Hospital Association

Greeting
C. W. Mayo, M.D.

"Aids to General Anesthesia"
E. B. Tuohy, M.D.

"Obstetrical Anesthesia"
R. T. Knight, M.D.

Discussion—
J. S. Lundy, M.D., Department of Anesthesia, Mayo Clinic

"The National Association of Nurse Anesthetists—Its Objectives, Purposes and Requirements for Membership"
Anna Willenborg, St. Joseph's Hospital, Chicago

General discussion

7:00 P.M. Banquet

Saturday morning, May 15th

Clinics

MISSISSIPPI

The first annual meeting of the Mississippi Association of Nurse Anesthetists will be held in Meridian, Miss., on May 11th, 1937. Tentative program follows:

GENERAL SESSION

Greetings A. M. McCarthy, M.D.,
Electric Mills, Miss.
President, Mississippi Hospital Association

Mrs. Sam Owen,
George C. Hixon Memorial Hospital, Electric Mills, Miss.
(subject to be announced later)

W. A. Evans, M.D.
(subject to be announced later)

Mrs. Irene Mason
Greenville, Miss.
"The Human Equation in Anesthesia"

Address—Miss Emma Easterling, President
Mississippi Association of Nurse Anesthetists

BUSINESS MEETING

NEW YORK

The fourth annual meeting of the New York Association of Nurse Anesthetists will be held in New York City, May 20th, 21st, and 22nd, 1937, in conjunction with the New York Hospital Association. Headquarters at the Hotel Astor. For further information write Miss Ida M. Edwards, President, Strong Memorial Hospital, Rochester, N. Y., or Miss Hazel Blanchard, Secretary-Treasurer, 1910 Seventh Avenue, Troy, N. Y.

PROGRAM

Thursday, May 20th

9:00-10:00 Registration—Hotel Astor, South Garden Room

10:00-12:00 Clinic—Cornell Medical Center
William DeWitt Andrus, M.D.
(subject to be announced later)
Sara M. Mullin
Anesthetist in charge of surgery clinic

12:30-1:30 Luncheon (place to be announced later)

1:45 General Session
Hotel Astor, South Garden Room

Greetings
Ida M. Edwards
President, New York Association of Nurse Anesthetists

2:00 "How and When to Use Cyclopropane"
Hope Ross, M.D.
Chief Anesthetist, North Hudson Hospital, Weehawken, N. J.

2:30 "Anesthesia in Obstetrics"
Harvey Burleson Matthews, M.D., F.A.C.S.,
Obstetrician and Gynecologist
Methodist Episcopal Hospital
Long Island College Hospital
Coney Island Hospital

3:00 "Positions in Gallbladder Surgery"
Russell Story Fowler, M.D., F.A.C.S.,
Chief Surgeon, Wyckoff Heights Hospital
Consulting Surgeon, Methodist Episcopal Hospital

7:00 Banquet, Hotel Astor,
with New York State Hospital Association

Friday, May 21st

9:00-11:00 Business Meeting
Hotel Astor, South Garden Room

11:15 "Anesthesia in the Bad Risk Patient"
Genevieve Bush
Albany City Hospital

12:00 Luncheon
Round table discussion

1:30 "The Fire and Explosive Hazards Involved in the Use of Cyclopropane as an Anesthetic"
Frances Hess, Chief Anesthetist,
Long Island College Hospital School of Anesthesia

2:00 Joint Meeting with
New York State Hospital Association

2:15 "The Future of the Nurse Anesthetist"
Hilda R. Salomon
President, National Association of Nurse Anesthetists

2:30 "Modern Anesthesia From the Standpoint of the Surgeon"
(speaker to be announced later)
Discussion
Ida M. Edwards, President
New York State Association of Nurse Anesthetists
and
Miriam G. Shupp, Strong Memorial Hospital, Rochester, N. Y.

3:00 "Anesthesia in Oral Surgery of Infants"
Harold S. Vaughan, M.D., D.D.S.,
Oral Surgeon, Post Graduate Hospital
Consulting Oral Surgeon, Woman's Hospital

Saturday, May 22nd

11:00 "Anesthesia in Neuro-Surgery"
Jefferson Browder, M.D., F.A.C.S.,
Long Island College Hospital
Brooklyn Hospital
Methodist Episcopal Hospital
Holy Family Hospital
Saint Giles Hospital
Beth Moses Hospital
King's County Hospital

OREGON

The Oregon anesthetists are holding monthly meetings in Portland. Dr. Ralph Matson gave a splendid talk on "The Lungs in regard to Anesthesia," and Dr. Dean B. Seabrook read a paper on "Blood Pressure Readings During Anesthesia" at the February meeting.

PENNSYLVANIA

The sixth annual meeting of the Pennsylvania Association of Nurse Anesthetists will be held at Buck Hill Falls, Penna., June 2nd, 3rd and 4th, 1937, in conjunction with the Pennsylvania Hospital Association.

PROGRAM

Wednesday, June 2nd

Registration—Buck Hill Falls Inn
Visit to commercial exhibits

12:30 P.M. Luncheon—Buck Hill Falls Inn
Marian L. Robinson, Presiding
President, Pennsylvania Association of Nurse Anesthetists

2:00 P.M. *GENERAL SESSION*
Elsa Freese Windisch, Presiding

Address—Melvin L. Sutley, President
Hospital Association of Pennsylvania

Address—Hilda R. Salomon, President
National Association of Nurse Anesthetists
Jewish Hospital, Philadelphia, Pa.

Address—Marian L. Robinson, President
Pennsylvania Association of Nurse Anesthetists

"Impressions of Some of the Newer Methods of Anesthesia"
W. Wayne Babcock, M.D., Professor of Surgery,
Temple University Hospital, Philadelphia

"Anesthesia in Thyroid Surgery"
Harold M. Foss, M.D., Surgeon-in-Chief,
Geisinger Memorial Hospital, Danville, Penna.

2:00 P.M. "Ethylene Anesthesia"
Laura D. Bryant,
Cooper Hospital, Camden, N. J.

"Cyclopropane Anesthesia for Upper Abdominal Surgery"
Mary E. Walton
Mercy Hospital, Pittsburgh, Penna.

"Nitrous Oxide-Oxygen Anesthesia in Exodontia and Oral Surgery"
Esther M. Staiger,
Philadelphia, Pa.

Thursday, June 3rd

10:00 A.M. *BUSINESS SESSION*
Marian L. Robinson, Presiding

Report of Secretary-Treasurer
Reports of Committees
Election of Officers
Introduction of New Officers
New Business

12:30 P.M. Luncheon

2:00 P.M. *GENERAL SESSION*
Helen M. Young Walker, Presiding

"Relationship of Anesthetist to the Hospital"
Esther J. Tinsley
Superintendent, Pittston Hospital, Pittston, Penna.

"The Significance of Certain Reflexes During Various Stages of Inhalation Anesthesia"
George J. Thomas, M.D., Instructor in Anesthesia, University of Pittsburgh, Pittsburgh, Penna.

"Chest Surgery"
John B. Flick, M.D.,
Pennsylvania Hospital, Philadelphia

"Spinal Anesthesia"
Clinton Herrmann, M.D.,
Philadedphia

"Evipal Anesthesia"
Blanche Shekletski
Jewish Hospital, Philadelphia

7:00 P.M. Banquet—sponsored by Hospital Association of Pennsylvania
Buck Hill Falls Inn

Friday, June 4th
Hike

10:00 A.M. Breakfast
Round Table
Leader—Marian L. Robinson

For further information write Miss Rose G. Donovan, Secretary-Treasurer, Mount Sinai Hospital, Philadelphia, Penna.

TEXAS

The second annual meeting of the Texas Association of Nurse Anesthetists was held in Lubbock, Texas, April 23rd and 24th, 1937, in conjunction with the Texas Hospital Association. Greetings were extended to the Texas anesthetists by Mrs. Martha Roberson, President of the Texas Hospital Association, by Mr. Robert Jolly, Memorial Hospital, Houston, and Mr. Bryce Twitty, Baylor University Hospital, Dallas, and the following papers were read:

"Anesthesia"
E. L. Hunt, M.D., Surgery, Urology and Obstetrics,
Lubbock Clinic, Lubbock, Texas

"Oxygen Therapy"
W. H. Potts, M.D., Dallas, Texas

"Negative and Positive Pressure in Anesthesia"
Mrs. Velma Thompson, Baylor University School of Anesthesia, Dallas, Texas

Round Table—"Problems in Anesthesia"
Conducted by Osa M. Beck, San Angelo Medical and Surgical Clinic, San Angelo, Texas

"Anesthesia in Oral Surgery"
Miss Lettie East, Witchita General Hospital, Witchita Falls, Texas

"Trends in Obstetrical Anesthesia and Analgesia"
Carey Hiett, M.D., Obstetrician and Gynecologist,
Methodist Hospital, Fort Worth, Texas

An interesting clinic was held at the Lubbock Sanitarium, and the anesthetists attended the banquet and ball and also the luncheon, given by the Texas Hospital Association.

WISCONSIN

A meeting of the Milwaukee Nurse Anesthetists' Association was held Feb. 8th at the Pfister Hotel to discuss the organization of a Wisconsin Association of Nurse Anesthetists. All hospitals in Milwaukee but one were represented. Miss Catherine Cameron, who was Chairman of the Local Arrangements Committee for the first annual meeting of the National Association of Nurse Anesthetists held in Milwaukee in September, 1933, and who was largely responsible for the success of that meeting, acted as Chairman of the meeting on February 8th.

The proposed organization plans were thoroughly discussed and necessary committees were formed to carry through the purposes of this organi-

zation meeting. The following members were appointed to submit at the next meeting a proposed constitution and by-laws: Miss Mary Donovan, Chairman; Miss Flash, Miss Cunningham, Miss Fitzgerald, and Mrs. Hepp.

The following were appointed to submit at the next meeting a tentative ballot: Miss Burgess, Chairman; Miss Laughlin and Miss Tinker.

The next meeting was held March 8th, 1937, at the Children's Hospital. The proposed constitution and by-laws was submitted and after discussion was accepted as read.

The following officers were elected:

President	Miss Catherine Cameron, St. Joseph's Hospital, Milwaukee
Vice-President	Miss Mary Donovan, Milwaukee County General Hospital, Milwaukee
Secretary	Miss Evelyn Hurff, Columbia Hospital, Milwaukee
Treasurer	Miss Julia C. Jahn, 4315 West Lisbon Avenue, Milwaukee

HAWAII

An organization meeting of the anesthetists in Hawaii was held on March 16, 1937, at the Queen's Hospital, Honolulu, T. H., and the following officers were elected:

President	Esther Myers
Vice-President	Frances Reames
Executive Secretary	Alice Berg
Treasurer	Mrs. Fern Fuehrer
Historian	Josephine Westerman

Trustees

Esther Meyers	Fern Fuehrer
Frances Reames	Josephine Westerman
Alice Berg	Theresa Kossack
Georgia Maxwell	

Membership Committee

Edna Thompson
Beatrice Morin

The Hawaii Association voted unanimously to apply for affiliation with the National Association of Nurse Anesthetics.

OFFICERS

1936-37

Honorary President—Agatha C. Hodgins
President—Hilda R. Salomon
First Vice-President—Verna M. Rice
Second Vice-President—Olive L. Berger
Third Vice-President—Eva M. Dickson
Treasurer—Gertrude L. Fife

Trustees

Gertrude L. Fife	Miriam G. Shupp
Agatha C. Hodgins	Hilda R. Salomon
Helen Lamb	Anna Willenborg
Verna M. Rice	Clara A. Wurtz

COMMITTEES

Public Relations	Agatha C. Hodgins, Chairman
	Lou E. Adams
	Cora McKay
	Myra B. Quarles
	Jean O'Brien
	Marian Robinson
Revisions	Theresa McTurk, Chairman
	Hattie Vickers
	Mary A. Ware
Membership	Myrn E. Momeyer, Chairman
	Marjory Walker
	Marian Hollister
Publishing	Gertrude L. Fife, Chairman
	Esther Meil
	Florence Sargeant
	Gertrude Alexander Troster
	Louise Schwarting
Educational	Helen Lamb, Chairman
	Olive Berger
	Mary Muller
	Mae B. Cameron
	Sister Rudolpha

OHIO

The fourth annual meeting of the Ohio Nurse Anesthetists' Association was held at the Deshler-Wallick Hotel, Columbus, Ohio, April 13th and 14th, 1937, in conjunction with the Ohio Hospital Association. The attendance was excellent, and the program interesting and informative.

The speakers and topics included the following:

Dorothy Pfisterer, Address of Welcome

A. Sophie Rogers, M.D., "The Psychology of Anesthesia"

Neal W. Wood, M.D., "Administrative Relationship of the Nurse Anesthetist"

Clayton Smith, M.D., "The Pharmacology of Anesthetic Drugs"

George Nelson, M.D., "Anesthesia in Circulatory Disease"

Dick P. Snyder, M.D., "Anesthesia in Oral Surgery"

Mildred Sauers, Cleveland, "Anesthesia in Thoracic Surgery"

Edna Murray, Telodo, "Chloroform Anesthesia"

Mary V. Allison, Cleveland, "The Effects of Increased Pressure on Respiration and Circulation"

The All-Association banquet was held on Wednesday evening, April 14th. Mr. Guy Clark, President of the Ohio Hospital Association, acted as toastmaster. The address of the evening was by "Dusty" Miller, a most entertaining and interesting humorist. Music was furnished by Charles Bennet's orchestra and Miss Lena Metzger, singing accordionist.

The following officers were elected for 1937-38:

President	Alice Barth Youngstown Hospital, N.S. Unit, Youngstown, O.
First Vice-President	Mrs. Dessa Hale Hale Hospital, Wilmington, O.
Second Vice-President	Mary V. Allison University Hospitals, Cleveland, O.
Secretary-Treasurer	Ann M. Nightengale Lutheran Hospital, Cleveland, O.
Trustee, 3-year	Lucy E. Richards City Hospital, Cleveland, O.

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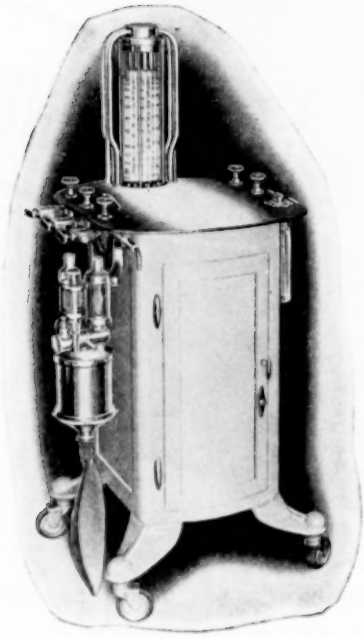

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